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UK METEOROLOGICAL OFFICE
GLOBAL DATA MONITORING REPORT

May 2003

Data Assimilation
Meteorological Office
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1. Introduction

As the WMO-appointed lead centre for monitoring surface marine data, the U.K. Meteorological Office produces monthly statistics on the quality of these observations received at RSMC Bracknell. This report includes this information along with statistics for most other types of data. The figures and tables contained herein are presented according to the agreed standards for the exchange of monitoring results.

The report is based on data received at the UK Meteorological Office Headquarters, Bracknell in time for inclusion into the appropriate analysis (the current cut-off time is approximately 7.2 hours after each analysis time). The evaluation of data quality is based on comparison with the appropriate 6-hour global model forecast (background) field, although to provide background values valid at the observation time for non-main hour data, time-interpolation of the T+3, T+6 and T+9 forecasts is used; and for sea surface temperature the background field is the analysis from the previous day. Generally, the background field is of high quality except in data sparse areas, tropical regions and areas close to steep orography where care should be taken in interpreting the statistics shown.

Comments or queries on the report are welcome and should be addressed to:-

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2 Global Data Monitoring Statistics

Ships, Fixed buoys, Platforms and Drifting buoys observations

TABLES 1and 2 contain lists of the stations which are considered to have returned suspect observations of pressure, windspeed, wind direction or sea surface temperature, as appropriate, during the month. The criteria for quality control are given on the header page for each table.

Figures 1 and 2 show 10 degree lat/long box average numbers of SHIP/SYNOP and DRIFTER observations received per day throughout the month at Bracknell and assimilated into model runs. All data are included. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

Synop Observations

Table 3 contains a list of stations which are considered to have returned suspect observations of Pressure during the month. The criteria for quality control are given in the header page. The reporting practice of each station is included in the list of statistics.

At the UK Met. Office, we monitor SYNOP pressure after it has been interpolated to our Global NWP Model's surface height. For most synoptic stations (about 75%), the surface pressure (at the model surface) is calculated from the reported station-level pressure, or, if this is not available, the height of a standard pressure-level (e.g. 850 hPa or 700 hPa). If neither of these are available, or if the reported station-level pressure is deemed unreliable, the reported mean sea-level pressure is used (about 25% of SYNOPs).

Aircraft observations

Tables 4A (300-150 hPa) and 4B (1000-301 hPa) contain lists of statistics calculated from data received from all airline carriers.

Figures 3A (300-150 hPa) and 3B (1000-301 hPa) show 10 degree lat/long box average numbers of aircraft reports in AIREP/AMDAR code (including AIREP, ACAR, AMDAR, ASDAR and ADS) received per day throughout the month at Bracknell and assimilated into model runs. Observations with a vector wind difference (compared with the model background field) of >60 m s^{-1} have been excluded. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

Figures 4A-7A (300-150 hPa) and 4B-7B (1000-301 hPa) show wind statistics for AIREP/ASDAR in AIREP/AMDAR code (including AIREP, ACAR, AMDAR, ASDAR and ADS). Observations with a vector wind difference > 60 m s^{-1} have been excluded. Statistics have not been calculated for 10 degree lat/long boxes containing <31 observations.

Figure	Parameter
4	Mean wind vectors
5	Mean observation - background wind vector
6	Mean observation-background speed (m s^{-1})
7	RMS observation-background vector (m s^{-1})

Radiosonde Observations

TABLES 5-7 contain lists of the stations which are considered to have returned suspect observations of geopotential height, vector wind or wind direction, as appropriate, during the month. The criteria for quality control are given on the header page for each table.

Figures 8 and 9 show 10 degree lat/long box average numbers of TEMP 500 hPa GEOPOTENTIAL HEIGHT and TEMP/PILOT 300 hPa WIND observations received per day throughout the month at Bracknell and assimilated into model runs. Data from all hours are included. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

APPENDIX I shows details of the gross error limits used in TABLES 5 and 6 and the weights used in the RMS values in TABLE 5.

Satellite Observations

Figures 10-24 show satellite wind statistics for all geostationary satellites. All plots other than **AVAILABILITY** show average data where there are > 10 observations in a 10 degree lat/long box.

Figure	Parameter Plotted	Layer (hPa)
10	Availability/average daily number	701-1000
11	Vector mean wind (observed)	701-1000
12	Observation-background vector wind difference	701-1000
13	Mean observation-background speed differences	701-1000
14	RMS observation-background vector difference	701-1000
15	Availability/average daily number	401-700
16	Vector mean wind (observed)	401-700
17	Observation-background vector wind difference	401-700
18	Mean observation-background speed differences	401-700
19	RMS observation-background vector difference	401-700
20	Availability/average daily number	101-400
21	Vector mean wind (observed)	101-400
22	Observation-background vector wind difference	101-400
23	Mean observation-background speed differences	101-400
24	RMS observation-background vector difference	101-400

Figures 25-39 show sounding statistics from the polar orbitting satellite NOAA-15. Figure 25 shows the mean daily number of ATOVS soundings, and figures 26-39 show mean and standard deviation observation-background differences for brightness temperature, for selected channels.

Figure		Weighting function peak (hPa)
26	Mean	Surface (HIRS8)
27	SD	Surface (HIRS8)
28	Mean	700 (HIRS15)
29	SD	700 (HIRS15)
30	Mean	500-700 (HIRS11)
31	SD	500-700 (HIRS11)
32	Mean	400 (HIRS4)
33	SD	400 (HIRS4)
34	Mean	700 (AMSUA5)
35	SD	700 (AMSUA5)
36	Mean	300 (AMSUA7)
37	SD	300 (AMSUA7)
38	Mean	100 (AMSUA9)
39	RMS	100 (AMSUA9)

Figures 40-54 show sounding statistics from the polar orbitting satellite NOAA-16. Figure 40 shows the mean daily number of ATOVS soundings, and figures 41-54 show mean and standard deviation observation-background differences for brightness temperature, for selected channels.

Figure		Weighting function peak (hPa)
41	Mean	Surface (HIRS8)
42	SD	Surface (HIRS8)
43	Mean	700 (HIRS15)
44	SD	700 (HIRS15)
45	Mean	500-700 (HIRS11)
46	SD	500-700 (HIRS11)
47	Mean	400 (HIRS4)
48	SD	400 (HIRS4)
49	Mean	700 (AMSUA5)
50	SD	700 (AMSUA5)
51	Mean	300 (AMSUA7)
52	SD	300 (AMSUA7)
53	Mean	100 (AMSUA9)
54	RMS	100 (AMSUA9)

Figures 55-69 show sounding statistics from the polar orbitting satellite NOAA-17. Figure 55 shows the mean daily number of ATOVS soundings, and figures 56-69 show mean and standard deviation observation-background differences for brightness temperature for selected channels.

Figure		Weighting function peak (hPa)
56	Mean	Surface (HIRS8)
57	SD	Surface (HIRS8)
58	Mean	700 (HIRS15)
59	SD	700 (HIRS15)
60	Mean	500-700 (HIRS11)
61	SD	500-700 (HIRS11)
62	Mean	400 (HIRS4)
63	SD	400 (HIRS4)
64	Mean	700 (AMSUA5)
65	SD	700 (AMSUA5)
66	Mean	300 (AMSUA7)
67	SD	300 (AMSUA7)
68	Mean	100 (AMSUA9)
69	RMS	100 (AMSUA9)

N.B. All satellite sounding data is bias-corrected (and thinned) before being assimilated in the UKMO NWP model.

3 Composite Observing Systems for the North Atlantic (COSNA)

This section shows statistics for upper air (radiosonde and aircraft) and surface (drifter) data for the North Atlantic area for data received at Bracknell during the month.

TABLE 8 shows quality statistics for **Mean Sea-level Pressure, Windspeed and Wind Direction** received at Bracknell in DRIFTER code during the month for the area 10°N - 80°N, 85°W - 0°W.

TABLE 9 shows quality statistics for **Temperature and Vector Wind** received at Bracknell from aircraft during the month for the area 40°N - 70°N, 60°W - 0°W.

Table 10 - 13 show quality statistics (**Geopotential Height and Windspeed at 100 and 500 hPa**) for all TEMPSHIPS in the area bounded by 0°N - 90°N, 100°W - 40°E and selected TEMP stations within the same area.

Revisions

1. May 95 Monitoring statistics for NOAA-11 removed. Figures 25-27 now show data for NOAA-12
2. May 95 Notes giving details of observations included in wind direction statistics clarified and corrected.
3. August 95 Monitoring statistics for NOAA-14 added with figures 28-30.
4. February 96 Monitoring statistics for GOES-7 have been replaced by statistics for GOES-8 and GOES-9.
5. April 96. 500 km and 120 km SATEMs replaced by 120 km resolution temperature profiles produced locally from the radiances disseminated by NESDIS.
6. February 97 Monitoring statistics for Meteosat 5 have been replaced by statistics for Meteosat 6.
7. Sept 97 Monitoring statistics for NOAA-12 removed. Figures 25-27 now show data for NOAA-11
8. January 1998. Increase in resolution of UKMO global forecast model.
9. April 1998. GOES winds ceased on 2nd March 1998, and were replaced with GOES high resolution winds from 15th.
10. June 1998. Monitoring statistics for Meteosat-6 were replaced by monitoring statistics for Meteosat-7, from 3rd June.
11. June 1998. Corrections in our processing of radiosonde data resulted in a decrease in the number of 500hPa geopotential heights in Figure 8 of about 230 per 24 hours (compared with previous reports), and a small increase in the number of 300hPa winds in Figure 9.
12. July 1998. Meteosat-5 began transmitting winds from 2nd July, at 63 degrees East (over the Indian ocean), and this data is included in the statistics.
13. July 1998. GOES-9 (at 135W) was replaced mid-month by GOES-10 (initially at 105W, moving towards 135W).
14. February 1999. Problems with NOAA-11, and TOVS data ceased to be assimilated from 26 February.
15. March 1999. UKMO introduced 3-D VAR assimilation system on 29 March, and also began assimilating ATOVS data from NOAA-15.
16. May 1999. Included statistics for ATOVS sounding data from NOAA-15.
17. September 1999. Included statistics for high resolution visible winds from Meteosat-5 and Meteosat-7.
18. October 1999. The 3-D VAR assimilation system was upgraded on 19 October, including improvements in the assimilation of ATOVS radiances, use of SSM/I surface wind speed, an improvement in the calculation of surface pressure for SYNOPs, and thinning and revision of observation errors of aircraft data.
19. November 1999. High resolution visible winds from Meteosat-5 and Meteosat-7 removed until used operationally.
20. April 2000. Aireps in Table 4 and Figures 3-7 split into ranges 300-150 hPa (A) and 1000-301 hPa (B).
21. September 2000. Corrected an error affecting the mean positions of a minority of buoys in Table 2.
22. November 2000. An error in the production of Table 6 was corrected. Previously, some sondes with suspect vector winds were being missed.
23. April 2001. Included statistics for ATOVS sounding data from NOAA-16.
24. May 2001. Included statistics for sea surface temperatures from marine surface observations.
25. December 2002. Included statistics for ATOVS sounding data from NOAA-17.
26. December 2002. Meteosat-7 and Meteosat-5 SATOB winds replaced by higher resolution BUFR-coded winds.

TABLE 1

MONITORING OF MARINE SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - SHIPS, FIXED BUOYS AND PLATFORMS
MONITORING CENTRE: BRACKNELL
MONTH: May 2003

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from each unique identifier for ships, fixed buoys and platforms.

Standard of comparison :Background field from UKMO global model.

Observation times :All hours

Elements monitored
:Mean sea level pressure (hPa).
:Wind speed ($m\ s^{-1}$).
:Wind direction (Degrees).
:Sea surface temperature (Degrees).

Parameters monitored

:NOBS :Number of observations received excluding duplicates.

:PGE :Percentage of observations with gross errors.

:%REJ :Percentage of observations flagged excluding those with gross errors.

:SD :SD of difference of observations from background values excluding those with gross errors.

:BIAS :Mean difference of observations from background values excluding those with gross errors.
N.B. a positive bias indicates the wind observation is veered to the background.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors.

GROSS ERROR LIMIT
:15 hPa (pressure)
:25 $m\ s^{-1}$ (vector wind)
:10 degrees (sea surface temperature)

SELECTION CRITERIA :NOBS ≥ 20 , and one or more of the following:

1.|bias| ≥ 4 hPa (pressure),
≥ 5 $m\ s^{-1}$ (wind speed),
≥ 30 degrees (direction).
≥ 3 degrees (sea surface temperature).

2.SD ≥ 6 hPa (pressure),
≥ 80 degrees (direction).
≥ 5 degrees (sea surface temperature).

3.PGE ≥ 25

N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed > 5 $m\ s^{-1}$

IDENTIFIER	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE							
CG2522	P	161	100	100			
CG2556	P	24	4	100	0.9	-11.2	11.2
CG2992	P	200	100	99			
C6QK	P	21	0	100	5.5	4.1	6.9
DICB	P	39	0	72	1.6	4.2	4.5
ELYD5	P	20	0	35	1.2	-4.2	4.4
KMJL	P	26	0	0	0.6	-4.4	4.4
KS011	P	33	52	100	2.7	-10.6	11.0
LAOL5	P	21	0	0	1.2	7.7	7.8
OUKN2	P	22	0	32	0.6	-6.6	6.6
UCJB	P	50	2	2	0.8	-4.3	4.4
UCJL	P	30	0	57	0.7	4.0	4.0
UCUC	P	40	100	100			
UDYG	P	52	4	81	5.3	-4.1	6.7
UFAA	P	56	0	93	1.1	6.0	6.1
UHLE	P	56	0	2	2.3	-8.3	8.6
VCLX	P	20	90	100	2.1	1.7	2.7
VDFP	P	24	96	100	0.0	-12.8	12.8
VTXG	P	27	0	22	1.1	4.9	5.1
V2AR5	P	57	0	0	0.9	-6.0	6.1
V2AZ5	P	20	0	85	6.6	-5.1	8.4
V2MH	P	75	0	1	1.0	-5.3	5.4
3FOC5	P	30	0	3	1.4	5.0	5.2
62114	P	52	0	0	0.6	6.0	6.0
62140	P	31	0	100	3.7	-4.3	5.7
WIND SPEED							
A8BJ7	SPEED	34	0	15	4.6	5.8	7.5
BBXX KS0	SPEED	316	0	100	2.1	-5.4	5.7
C6KU8	SPEED	28	11	100	4.2	19.6	20.0
DQVJ	SPEED	60	0	30	4.3	5.5	7.0
ELTY4	SPEED	27	0	41	6.6	8.6	10.8
KS004	SPEED	112	0	100	1.8	-5.1	5.4
KS010	SPEED	184	0	100	1.3	-6.2	6.4
OWKF2	SPEED	53	4	68	6.0	6.3	8.7
SJEI	SPEED	20	0	10	5.9	5.2	7.9
UCTA	SPEED	76	1	100	3.9	-5.4	6.6
UDUR	SPEED	38	0	100	1.6	-6.7	6.9
WIND DIRECTION							
V2EN	DIRN.	20	0	0	42.7	31.9	53.3
23101	DIRN.	37	0	0	61.3	75.1	97.0
23168	DIRN.	34	0	0	21.3	86.4	89.0
42047	DIRN.	45	0	0	35.0	-30.0	46.1
SEA SURFACE TEMPERATURE							
CGDS	SST	56	0	100	1.3	3.8	4.0
CG2522	SST	136	68	100	1.4	7.6	7.7
CG2960	SST	242	19	100	2.9	3.5	4.5
CG2992	SST	183	100	100			
CG8048	SST	48	100	100			
C6Q09	SST	21	0	100	1.9	3.4	3.9
DBBX	SST	529	49	100	1.0	0.1	1.0
DBBXX	SST	35	34	69	0.9	0.2	1.0
EIQN	SST	495	50	100	0.4	0.1	0.4
ELOG5	SST	42	0	100	1.3	6.4	6.5
ELWY3	SST	43	0	100	0.7	3.6	3.6
FNJI	SST	117	0	100	0.6	3.3	3.3
H9TA	SST	24	4	71	1.9	4.7	5.1
KS000	SST	121	31	31	1.1	0.5	1.2
KS008	SST	169	52	79	2.3	1.6	2.8

IDENTIFIER	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
SEA SURFACE TEMPERATURE							
KS011	SST	117	7	86	3.9	6.4	7.5
KS014	SST	25	76	96	7.5	2.0	7.8
KS025	SST	204	32	32	0.7	0.5	0.9
LACF5	SST	65	0	100	1.3	3.4	3.7
PCIG	SST	34	0	97	0.4	-3.0	3.0
P3KT8	SST	33	0	64	1.2	4.6	4.8
SIWB	SST	24	0	100	0.4	5.2	5.2
S6JQ	SST	21	5	62	4.0	-4.5	6.1
UCEF	SST	26	12	50	3.1	-3.4	4.6
UCMQ	SST	24	0	54	1.4	-4.0	4.2
UCMS	SST	29	0	21	1.7	3.1	3.5
UIAC	SST	33	0	100	1.1	6.9	7.0
UINM	SST	38	3	100	0.7	3.6	3.6
VGNW	SST	24	25	42	2.3	1.3	2.6
VJRB	SST	21	0	100	0.5	-3.2	3.2
VOCJ	SST	211	12	100	2.0	6.1	6.4
V2AT1	SST	49	45	100	0.9	-8.7	8.8
V2IA1	SST	27	0	33	3.1	-3.0	4.4
V2PK	SST	31	0	100	1.9	3.0	3.6
V7DN3	SST	83	0	84	1.5	-3.3	3.6
WCW9126	SST	88	92	100	1.1	-0.2	1.1
WWU8	SST	37	100	100			
YJQL3	SST	31	0	100	0.9	-4.9	5.0
ZCBD2	SST	27	0	59	2.9	-4.2	5.1
3EJB9	SST	20	0	100	0.7	3.2	3.3
44014	SST	672	0	86	1.1	-4.2	4.3
44150	SST	271	1	99	1.3	5.0	5.2
45008	SST	225	0	83	0.8	-4.1	4.1
45140	SST	347	100	100			
45142	SST	662	0	75	1.3	3.0	3.2
45147	SST	357	100	100			
45149	SST	659	0	100	0.7	-4.5	4.6
45152	SST	411	100	100			
46131	SST	654	100	100			
46146	SST	648	100	100			
46181	SST	657	100	100			

Figure 1. SHIP/SYNOP mean daily count. MAY 2003
All hours
Global average number of observations in 24 hours = 19808

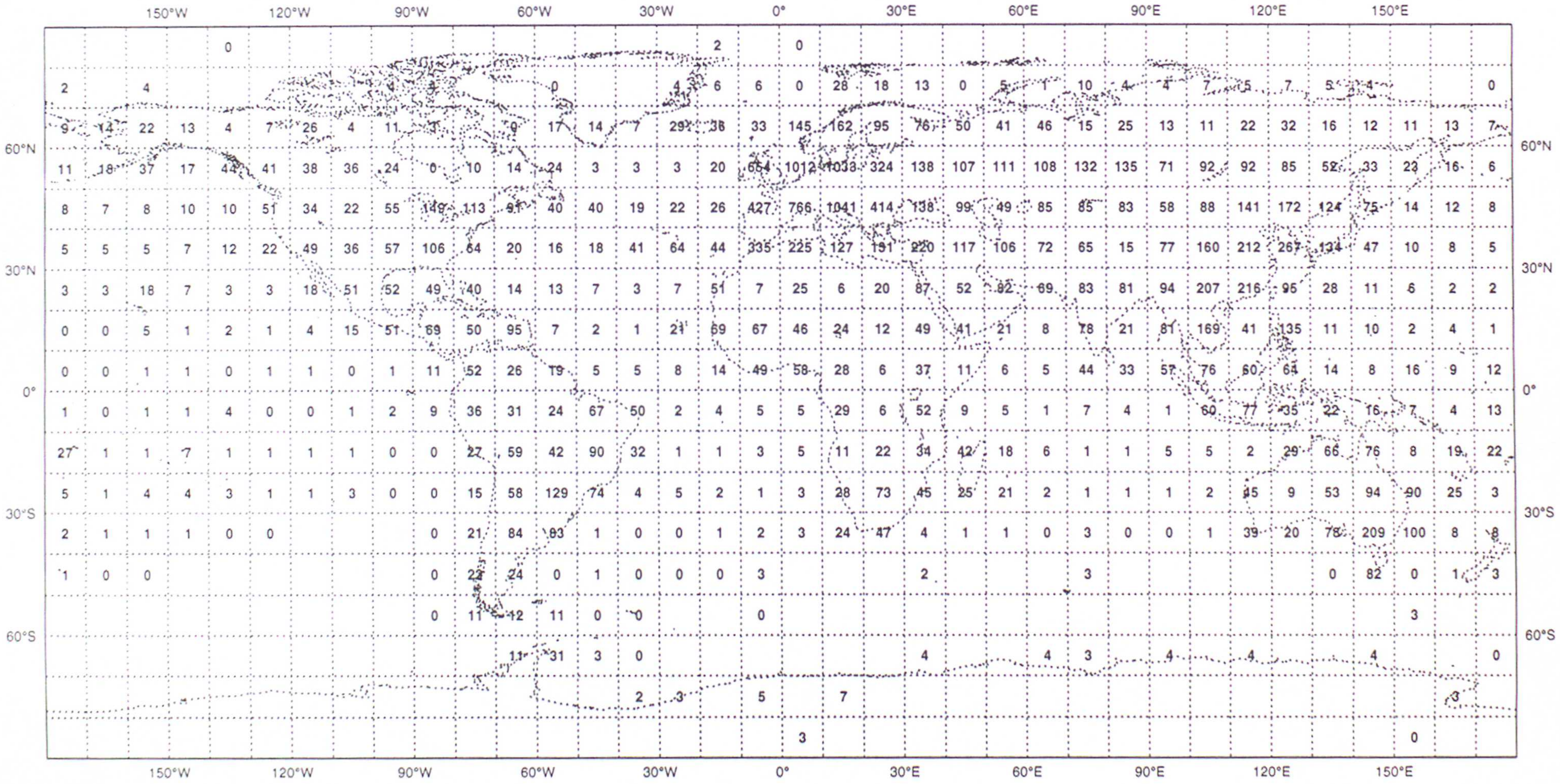

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
0 2 0
2 4 4 3 0 4 6 6 0 28 18 13 0 5 1 10 4 4 7 5 7 5 4 0
9 14 22 13 4 7 26 4 11 3 9 17 14 7 29 38 33 145 162 95 76 50 41 46 15 25 13 11 22 32 16 12 11 13 7
11 18 37 17 44 41 38 36 24 0 10 14 24 3 3 3 20 654 1012 1038 324 138 107 111 108 132 135 71 92 92 85 52 33 23 16 6
8 7 8 10 10 51 34 22 55 149 113 91 40 40 19 22 26 427 766 1041 414 138 99 49 85 85 83 58 88 141 172 124 75 14 12 8
5 5 5 7 12 22 49 36 57 106 64 20 16 18 41 64 44 335 225 127 191 220 117 106 72 65 15 77 160 212 267 134 47 10 8 5
3 3 18 7 3 3 18 51 52 49 40 14 13 7 3 7 51 7 25 6 20 87 52 82 69 83 81 94 207 216 95 28 11 6 2 2
0 0 5 1 2 1 4 15 51 69 50 95 7 2 1 21 69 67 46 24 12 49 41 21 8 78 21 81 169 41 135 11 10 2 4 1
0 0 1 1 0 1 1 0 1 11 52 26 19 5 5 8 14 49 58 28 6 37 11 6 5 44 33 57 76 60 64 14 8 16 9 12
1 0 1 1 4 0 0 1 2 9 36 31 24 67 50 2 4 5 5 29 6 52 9 5 1 7 4 1 60 77 35 22 16 7 4 13
27 1 1 7 1 1 1 1 0 0 27 59 42 90 32 1 1 3 5 11 22 34 42 18 6 1 1 5 5 2 29 66 76 8 19 22
5 1 4 4 3 1 1 3 0 0 15 58 129 74 4 5 2 1 3 28 73 45 25 21 2 1 1 1 2 45 9 53 94 90 25 3
2 1 1 1 0 0 0 21 84 83 1 0 0 1 2 3 24 47 4 1 1 0 3 0 0 1 39 20 78 209 100 8 8
1 0 0 0 22 24 0 1 0 0 0 3 2 3 0 82 0 1 3
0 11 12 11 0 0 0 3
11 31 3 0 4 4 3 4 4 4 0
2 3 5 7 3
3 0
150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E

TABLE 2

MONITORING OF MARINE SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - DRIFTING BUOYS
MONITORING CENTRE: BRACKNELL
MONTH: May 2003

Monitoring procedures

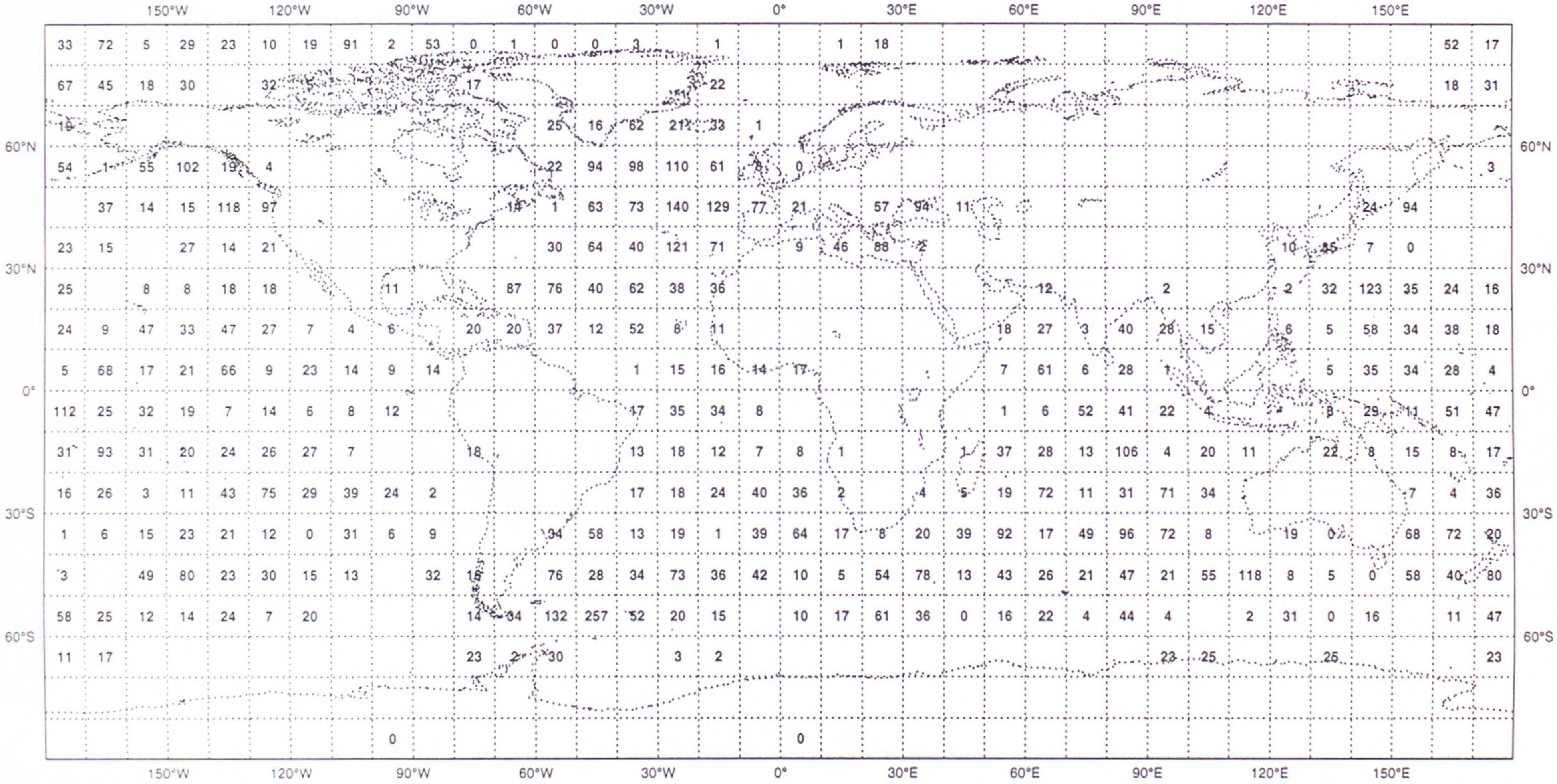
Period		:One calendar month.
Data monitored		:Reports from each unique identifier for drifting buoys.
Standard of comparison		:Background field from UKMO global model.
Position		:Average latitude and longitude for period.
Observation times		: All hours
Elements monitored		:Mean sea level pressure (hPa). :Wind speed (m s^{-1}). :Wind direction (degrees). :Sea surface temperature (degrees).
Parameters monitored		
	:NOBS	:Number of observations received excluding duplicates.
	:PGE	:Percentage of observations with gross errors.
	:%REJ	: Percentage of observations flagged excluding those with gross errors
	:SD	:SD of difference of observations from background values excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values excluding those with gross errors. **N.B. a positive bias indicates the wind observation is veered to the background.**
	:RMS	:Root Mean Square difference of observations from background values excluding those with gross errors.

GROSS ERROR LIMIT	:15 hPa	(pressure)	
	:25 m s^{-1}	(vector wind)	
	:10 degrees	(sea surface temperature)	
SELECTION CRITERIA :	NOBS	≥ 20 , and one or more of the following:	
	1.|bias|	≥ 4 hPa	(pressure),
		≥ 5 m s^{-1}	(wind speed),
		≥ 30 degrees	(direction).
		≥ 3 degrees	(sea surface temperature).
	2.SD	≥ 6 hPa	(pressure),
		≥ 80 degrees	(direction).
		≥ 5 degrees	(sea surface temperature).
	3.PGE	≥ 25.	

N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed > 5 m s^{-1}

IDENTIFIER	LAT.	LONG.	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE									
14911	-13.5	59.0	P	309	17	100	3.5	7.5	8.3
16561	-48.4	35.9	P	560	11	91	6.3	5.6	8.5
23594	13.1	88.3	P	63	40	40	0.6	-0.3	0.6
33512	-37.3	-44.6	P	439	54	100	6.5	-5.7	8.6
44769	59.5	-33.5	P	48	46	92	5.2	9.9	11.2
48574	73.7	-144.6	P	897	28	93	4.4	-0.5	4.4
55630	-47.4	157.2	P	102	45	55	2.8	1.0	2.9
55905	-51.7	-57.9	P	60	2	98	1.8	-7.5	7.7
56529	-56.4	119.8	P	81	32	100	4.6	5.1	6.8
56538	-30.6	88.8	P	202	68	70	0.7	0.8	1.0
61670	35.0	21.8	P	416	65	70	3.6	-1.8	4.0
61673	41.9	28.0	P	371	49	95	7.1	4.8	8.6
WIND SPEED									
52516	26.2	142.7	SPEED	564	23	100	8.9	6.5	11.0
WIND DIRECTION									
21535	29.3	145.0	DIRN.	476	0	0	21.5	-37.0	42.8
41532	21.9	-67.4	DIRN.	404	0	0	13.8	36.7	39.2
52518	19.6	149.5	DIRN.	159	0	0	31.5	-38.8	50.0
52525	13.7	155.5	DIRN.	258	0	0	33.2	-34.6	47.9
52536	12.0	154.1	DIRN.	214	0	0	33.3	-31.7	46.0
52538	10.3	154.1	DIRN.	263	0	0	41.0	-36.7	55.0
52540	10.7	142.6	DIRN.	71	0	0	31.3	-49.4	58.5
52646	13.6	142.5	DIRN.	91	0	0	28.1	-40.8	49.5
52647	13.8	143.2	DIRN.	91	0	0	27.0	-39.8	48.1
SEA SURFACE TEMPERATURE									
13597	14.9	-18.2	SST	113	48	75	5.6	-4.3	7.0
13598	16.2	-17.8	SST	114	58	59	1.5	1.3	1.9
17563	-28.3	-6.0	SST	727	100	100			
32526	9.2	-85.2	SST	229	100	100			
33502	-28.2	-17.1	SST	112	6	100	0.6	3.1	3.2
44614	63.8	-36.5	SST	1146	2	100	2.4	4.4	5.0
44726	60.7	-39.9	SST	992	4	99	3.4	3.2	4.7
44778	42.3	-48.8	SST	365	5	100	2.2	-4.5	5.0
46553	57.9	-150.0	SST	35	54	100	5.1	0.5	5.1
46780	60.2	-176.3	SST	604	8	100	1.0	3.7	3.8
46972	19.7	-152.3	SST	217	6	100	0.3	4.6	4.6
51642	-9.7	-175.4	SST	24	96	96	0.0	1.8	1.8
51761	-4.3	162.1	SST	288	3	100	0.9	4.1	4.2
51832	-13.5	-158.2	SST	272	15	92	2.8	-6.0	6.6
51835	-2.3	148.9	SST	110	47	51	1.2	-0.1	1.2
62507	54.3	-11.9	SST	157	100	100			

Figure 2. DRIFTER mean daily count. MAY 2003
All hours
Global average number of observations in 24 hours = 10414



33	72	5	29	23	10	19	91	2	53	0	1	0	0	3		1			1	18														52	17
67	45	18	30		32	5				17						22																		18	31
19												25	16	62	21	33	1																		
54	1	55	102	19	4							22	94	98	110	61	8	0																	3
	37	14	15	118	97						14	1	63	73	140	129	77	21		57	94	11										24	94		
23	15		27	14	21							30	64	40	121	71		9	46	88	2									10	45	7	0		
25		8	8	18	18			11			87	76	40	62	38	36								12			2			2	32	123	35	24	16
24	9	47	33	47	27	7	4	6		20	20	37	12	52	8	11							18	27	3	40	28	15		6	5	58	34	38	18
5	68	17	21	66	9	23	14	9	14					1	15	16	14	17					7	61	6	28	1				5	35	34	28	4
112	25	32	19	7	14	6	8	12						17	35	34	8						1	6	52	41	22	4			8	29	11	51	47
31	93	31	20	24	26	27	7			18				13	18	12	7	8	1			1	37	28	13	106	4	20	11		22	8	15	8	17
16	26	3	11	43	75	29	39	24	2					17	18	24	40	36	2		4	5	19	72	11	31	71	34					7	4	36
1	6	15	23	21	12	0	31	6	9			34	58	13	19	1	39	64	17	8	20	39	92	17	49	96	72	8		19	0		68	72	20
3		49	80	23	30	15	13		32	15		76	28	34	73	36	42	10	5	54	78	13	43	26	21	47	21	55	118	8	5	0	58	40	80
58	25	12	14	24	7	20				14	34	132	257	52	20	15		10	17	61	36	0	16	22	4	44	4		2	31	0	16		11	47
11	17									23	2	30			3	2											23	25			25				23
								0										0																	

TABLE 3

MONITORING OF LAND SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - SYNOPS & AUTOSYNOPS
MONITORING CENTRE: BRACKNELL
MONTH: May 2003

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from each unique identifier for synops & autosynops.
Standard of comparison		:Background field from UKMO global model.
Observation times		:00, 06, 12, 18 UTC
Elements monitored		:Surface pressure (hPa).
Parameters monitored	:HT(m)	:Station height (in metres) as given in WMO No. 9 Vol A
	:RP	:Pressure reporting practice M=mean sea level pressure (hPa) reported. S=Station level pressure reported. 8=Geopotential height (m) of 850 hPa surface reported. 7=Geopotential height (m) of 700 hPa surface reported.
	:NOBS	:Number of observations received excluding duplicates.
	:NGE	:Number of observations with gross errors.
	:PGE	:Percentage of observations with gross errors.
	:%REJ	:Percentage of observations flagged excluding those with gross errors.
	:SD	:SD of difference of observations from background values excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values excluding those with gross errors.
GROSS ERROR LIMIT	:15 hPa	(pressure)
SELECTION CRITERIA	:NOBS	≥ 20 ,and one or more of the following:
	1.|bias|	≥ 4 hPa
	2. SD	≥ 6 hPa
	3.PGE	≥ 25.

N.B. For stn ht ≥ 500m, mslp is that calculated from station level pressure where available.
For stn ht < 500m, mslp is that as reported by the station where available.

WMO REGION 1:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
60728	36.4N	10.7E	1	MS	60	0	0	0	0.8	-8.6	8.6
61492	16.1N	13.5W	18	MS	58	0	0	0	1.5	4.1	4.4
62790	12.1N	24.9E	674	M	43	2	5	2	1.3	4.7	4.9
63330	13.5N	39.5E	2070	MS	25	25	100	0			
63333	11.1N	39.7E	1903	MS	25	0	0	0	0.4	5.8	5.8
63334	10.3N	37.7E	2515	MS	25	0	0	4	2.2	10.8	11.0
63450	9.0N	38.8E	2354	MS	20	0	0	0	0.6	5.4	5.4
63453	8.9N	39.9E	930	S	25	1	4	0	0.6	-5.1	5.1
63801	4.9S	29.6E	882	S8	83	2	2	1	0.8	7.6	7.6
63881	8.0S	31.6E	1923	S	32	0	0	0	0.7	12.7	12.7
65355	9.8N	1.1E	342	MS	105	0	0	4	2.7	-11.7	12.0
67223	13.1S	39.0E	534	S8	54	2	4	0	0.8	12.1	12.1
68014	19.6S	18.1E	1411	S8	46	0	0	11	3.3	-6.2	7.0
68312	26.5S	18.1E	1067	S8	47	5	11	0	0.6	4.7	4.7
68338	26.9S	24.6E	1234	S8	61	61	100	0			
68396	26.5S	31.3E	641	S8	42	1	2	0	1.1	4.4	4.5
68575	30.0S	30.0E	1175	S8	92	92	100	0			

WMO REGION 2:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
30554	54.5N	113.6E	995	MS	116	0	0	0	5.7	5.4	7.9
36982	41.9N	78.2E	3635	S7	113	0	0	0	0.6	6.7	6.7
38565	40.6N	65.7E	485	MS	114	50	44	0	1.3	-0.4	1.4
40435	24.5N	44.4E	991	MS	44	1	2	98	0.7	7.4	7.4
40700	39.6N	47.9E	45	MS	91	0	0	0	0.8	-5.3	5.4
40713	37.4N	46.3E	1475	MS	90	16	18	1	1.8	13.0	13.1
40741	36.5N	61.2E	235	MS	85	0	0	2	1.3	-4.7	4.9
40780	33.6N	46.4E	1362	MS	88	1	1	0	0.9	5.3	5.4
41254	23.1N	57.6E	1755	S8	80	80	100	0			
41396	16.0N	48.9E	700	MS	43	0	0	0	0.8	6.2	6.3
44265	46.1N	91.5E	1186	MS	112	0	0	1	1.4	5.0	5.2
47022	40.8N	128.2E	1224	S	85	2	2	1	1.2	4.2	4.4
48924	21.1N	101.5E	644	M	22	1	5	5	0.9	11.3	11.3
48925	20.7N	102.0E	550	S	34	2	6	3	1.8	-9.7	9.9
48938	19.2N	101.7E	326	MS	27	17	63	0	0.6	14.4	14.4
48957	14.8N	106.8E	105	MS	20	0	0	20	0.8	4.0	4.1
50727	47.2N	119.9E	1028	MS	116	0	0	0	0.8	4.5	4.6
51495	43.2N	91.7E	874	M	100	0	0	0	1.4	6.4	6.6
52866	36.6N	101.8E	2262	S	116	0	0	0	0.9	-4.4	4.5
56462	29.0N	101.5E	2994	S	116	0	0	1	1.2	8.0	8.1
56768	25.0N	101.5E	1773	S	112	0	0	0	0.7	-5.3	5.3
57816	26.6N	106.7E	1074	MS	116	50	43	0	1.2	-14.4	14.4

WMO REGION 3:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
80099	7.1N	70.7W	122	MS	33	0	0	0	1.5	-7.0	7.2
82181	2.0S	54.1W	146	MS	86	0	0	0	0.8	4.9	5.0
82704	7.6S	72.7W	170	MS	83	1	1	0	0.8	-4.6	4.7
83235	12.4S	46.4W	604	MS	87	0	0	0	0.7	6.3	6.3
83332	14.1S	46.4W	826	MS	87	22	25	0	0.5	14.2	14.2
83470	17.9S	50.9W	727	MS	87	0	0	0	0.6	-5.6	5.6
83531	18.6S	46.5W	940	MS	82	0	0	0	0.6	-6.8	6.8
83836	25.5S	50.6W	837	MS	88	0	0	0	0.8	-5.2	5.3
84425	5.9S	76.1W	179	MS	79	1	1	0	1.1	4.0	4.1
84455	6.5S	76.4W	281	MS	74	0	0	0	1.2	7.3	7.4

WMO REGION 3:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
84472	7.1S	78.5W	2620	S	60	0	0	0	0.6	-5.3	5.3
84474	7.2S	76.7W	350	S	25	0	0	0	1.1	9.9	10.0
84686	13.6S	72.0W	3248	M	107	0	0	0	0.7	-4.5	4.6
84688	13.7S	73.4W	3444	MS	49	1	2	0	0.5	-12.3	12.3
84720	14.9S	75.0W	567	MS	53	0	0	2	1.1	4.8	4.9
84782	18.1S	70.3W	468	MS	86	0	0	1	1.8	7.9	8.1
85140	14.3S	67.4W	140	MS	56	0	0	55	0.8	6.4	6.4
85264	18.5S	64.1W	1998	S	53	0	0	0	1.6	-11.2	11.3
85312	19.8S	63.9W	992	S	39	1	3	0	1.2	-12.2	12.3
85406	18.3S	70.3W	55	M	114	0	0	0	1.0	4.6	4.7
85432	22.5S	68.9W	2320	S8	77	0	0	0	0.7	5.0	5.0

WMO REGION 4:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
71049	66.0N	91.8W	150	MS	114	80	70	0	1.1	13.6	13.6
71181	47.1N	55.3W	29	MS	116	0	0	0	0.7	-6.0	6.0
71475	49.3N	124.8W	2	MS	115	0	0	0	0.7	-8.0	8.0
71599	44.4N	65.2W	127	MS	116	0	0	0	0.6	-4.2	4.2
76055	31.0N	114.9W	440	MS	71	71	100	0			
76118	30.4N	109.7W	1041	MS	21	0	0	0	0.7	-11.4	11.4
76543	22.0N	98.8W	104	MS	38	1	3	3	1.0	6.6	6.7
76658	19.2N	103.7W	494	MS	37	1	3	0	0.6	5.9	5.9
76683	19.3N	98.3W	2248	MS	80	0	0	0	0.9	4.1	4.2
76762	17.5N	99.5W	1265	MS	56	1	2	0	0.6	5.8	5.8
76773	17.8N	97.8W	1650	MS	24	0	0	0	0.7	4.4	4.5
76903	14.9N	92.3W	118	MS	101	0	0	2	1.9	6.1	6.4
78588	17.2N	87.5W	-257	M	115	111	97	0	0.7	0.6	0.9

WMO REGION 5:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
94130	14.8S	131.9E	120	MS	116	0	0	0	1.2	5.2	5.3
94541	29.8S	151.1E	584	MS	113	0	0	0	0.6	-9.0	9.0
96505	3.7N	115.7E	922	S8	28	28	100	0			
97378	10.7S	123.1E	1	MS	54	52	96	2	0.4	-14.3	14.3

WMO REGION 6:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
01360	61.9N	7.9E	711	MS	115	0	0	0	0.7	6.2	6.2
06685	47.0N	9.1E	515	MS	118	0	0	8	1.3	6.2	6.3
06780	46.8N	9.8E	2690	S7	118	0	0	0	0.5	4.3	4.3
08912	42.9N	0.8W	1434	MS	344	344	100	0			
08922	42.8N	0.2W	1660	MS	345	345	100	0			
10850	48.8N	10.7E	457	MS	344	0	0	0	0.5	-5.3	5.3
13269	44.3N	19.9E	176	MS	111	0	0	1	0.9	7.4	7.5
14554	44.9N	18.4E	136	S	55	1	2	2	1.6	-12.7	12.8
14650	43.8N	18.0E	970	S	55	2	4	47	1.3	-7.9	8.0
16470	36.8N	12.0E	191	MS	63	0	0	0	0.8	-4.2	4.3
16538	40.1N	9.3E	1022	S	36	0	0	3	1.3	8.6	8.7
17088	40.5N	39.5E	1219	S8	99	0	0	4	2.2	5.7	6.1
17203	38.9N	40.5E	1177	S8	75	0	0	0	1.1	4.8	4.9

ANTARCTIC:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
89004	71.7S	2.8W	815	MS	78	0	0	3	2.2	-7.8	8.1
89253	63.2S	55.4W	75	M	242	0	0	2	1.9	4.7	5.1
89263	66.0S	66.1W	20	M	259	2	1	0	7.4	7.0	10.2
89264	71.4S	68.9W	780	S	269	0	0	0	1.1	6.8	6.9
89272	75.0S	70.8W	1395	S	255	255	100	0			
89610	65.9S	113.1E	90	S	262	0	0	0	1.4	-7.4	7.5
89614	66.6S	111.2E	500	M	267	267	100	0			
89744	74.0S	43.1E	3353	S	270	0	0	0	0.9	7.4	7.5
89767	70.9S	69.9E	84	S	111	0	0	13	2.2	-4.1	4.7
89811	66.7S	112.8E	1366	S	262	0	0	0	1.3	-4.8	5.0

TABLE 4A

MONTHLY MONITORING OF AIRCRAFT OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: May 2003

Monitoring procedures

Period :One calendar month.

Data monitored :Statistics for each airline carrier.

Area monitored :90°N - 90°S, 180°W - 180°E.

Standard of comparison :Background field from UKMO global model.

Observation times :All hours combined.

Level(s) monitored :300.0 - 150.0 hPa

Elements monitored :TEMP in °C ; WIND in m s^{-1}

Parameters monitored

:N REP. :Number of observations received excluding duplicates.

:PG :Percentage of observations with gross errors.

:PR :Percentage of observations rejected by quality control including rejections from the duplicate check.

:PC :Percentage of observations with calm winds.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors in Temperature & vector wind.

:BIAS :Mean difference of observations from background values excluding those with gross errors in Temperature & Wind Speed.

GROSS ERROR LIMITS :10.0 °C ; 60 m s^{-1} Vector Wind

SELECTION CRITERIA :N REP $\geq$ 20

NB: All American ACARS data are grouped together and statistics are shown at the bottom of the table as "US ACARS".

		TEMPERATURE					WIND				
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
AAH	2824	0	41	1.4	0.2	2800	0	41	0	6.6	0.5
AAL	5915	0	38	1.7	0.1	5717	0	37	0	6.2	0.5
AAR	1373	1	6	1.7	-0.5	1364	0	8	0	8.7	0.3
ACA	2235	0	11	1.6	0.0	2042	0	12	0	7.5	0.4
ACI	74	0	35	2.3	0.6	73	0	36	0	9.1	1.3
AEA	940	1	3	1.4	0.6	552	0	3	0	6.9	0.3
AEL	398	1	9	1.7	-0.3	325	0	10	0	8.3	-0.3
AEW	43	2	5	1.5	-0.7	42	0	14	0	11.0	0.8
AFL	473	0	2	1.8	0.2	414	0	3	0	6.4	0.7
AFR	1444	1	5	1.3	0.1	1135	0	6	0	6.8	0.5
AIS	296	0	6	1.7	-0.3	274	1	9	0	8.3	0.1
AJM	385	0	2	1.5	-0.5	320	0	3	0	7.7	0.2
AJX	268	0	5	2.0	1.1	267	0	6	0	6.9	-0.2
AMM	146	0	3	1.4	0.5	111	0	5	0	8.9	0.1
AMT	1412	0	42	1.2	-0.1	1407	0	41	0	5.6	0.2
AMX	237	4	7	1.7	0.0	175	1	7	0	9.7	0.1
ANA	40	0	5	1.4	-0.2	39	0	5	0	8.3	-0.6
ANZ	4171	0	28	1.4	0.2	4158	0	28	0	7.0	0.9
ARG	30	0	23	1.4	0.5	27	4	33	0	10.1	4.5
ATN	91	2	100	3.6	-1.9	89	0	36	0	9.1	2.6
AVA	242	1	4	1.9	1.0	159	1	6	0	7.0	-0.1
AVN	140	1	49	1.4	0.4	145	0	48	0	6.1	0.5
AXF	44	0	39	2.6	0.6	44	0	41	0	11.8	-0.1
AZA	469	1	5	1.5	-0.2	406	0	5	0	8.1	0.2
BAF	27	0	0	1.8	-1.0	29	3	3	0	4.1	1.7
BAL	151	0	7	1.1	0.3	137	0	9	0	7.7	-0.2
BAW	725	0	7	1.8	-0.4	671	0	8	0	7.4	0.2
BBR	194	1	3	1.3	0.5	136	0	1	0	8.7	0.6
BPA	183	1	7	1.3	-0.1	161	4	12	0	7.0	0.2
BSK	34	9	24	3.5	0.8	34	0	21	0	9.9	-1.5
BWA	361	1	4	1.4	-0.2	280	0	4	0	7.8	-0.2
CAL	59	2	10	2.1	0.6	58	2	12	0	11.0	-1.6
CCA	67	0	19	2.1	-0.1	67	0	100	0	13.0	0.4
CES	141	3	13	1.5	0.4	142	1	13	0	8.9	0.3
CFC	55	0	15	1.7	-0.1	56	0	14	0	5.1	0.9
CFG	693	0	5	1.5	-0.5	610	0	5	0	6.7	0.1
CGA	144	0	1	1.4	-0.4	138	0	0	0	3.8	1.2
CGF	47	0	0	1.3	-0.3	46	0	0	0	4.5	0.7
CGH	140	0	2	1.3	-0.1	135	0	4	0	4.9	0.9
CKK	75	3	8	1.4	0.3	79	1	9	0	7.3	-0.5
CKS	406	0	31	1.8	0.8	395	1	30	0	7.6	0.2
CLX	376	0	5	1.6	-0.5	308	0	6	0	7.2	0.1
COA	275	1	36	1.3	0.0	195	0	37	0	6.8	0.0
CRL	494	2	5	1.4	0.5	385	0	4	0	7.8	0.4
CSN	63	0	13	2.1	-0.1	63	0	13	0	11.3	0.0
CUB	191	2	6	1.9	0.2	155	0	6	0	10.0	0.4
DAB	463	0	11	1.3	-0.2	450	0	12	0	3.9	0.7
DAI	276	0	5	1.3	0.2	267	0	5	0	3.7	0.9
DAL	2240	0	40	1.3	-0.2	2172	0	42	0	5.7	0.2
DBR	40	0	0	1.5	-0.6	40	3	3	0	5.7	-0.6
DCE	160	0	6	1.4	-1.0	144	0	8	0	7.4	0.5
DHL	195	2	100	6.5	-6.3	190	0	41	0	11.4	1.5
DLH	1155	0	15	1.7	-0.4	1092	0	14	0	6.4	0.9
EDW	47	0	6	1.9	-0.1	36	0	8	0	10.5	1.4
EEZ	22	0	9	1.5	0.7	22	0	5	0	4.1	0.7
EIA	331	1	72	3.1	1.6	330	0	100	0	18.9	4.7
ELY	142	1	6	2.0	-0.2	138	0	4	0	7.5	0.1
EVA	89	1	3	1.4	-0.3	103	2	5	0	7.5	0.6
FDX	2109	0	43	1.4	0.2	2101	0	44	0	7.3	0.3

		TEMPERATURE						WIND			
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
FGS	168	0	2	1.6	0.6	163	0	2	0	3.8	0.7
FIN	199	1	4	1.6	-0.1	190	0	3	0	6.4	0.5
FJI	827	2	49	1.6	0.6	821	0	49	0	10.0	-0.4
FOM	745	0	35	1.4	0.0	735	0	35	0	6.5	0.9
FWQ	47	2	51	1.0	0.2	47	0	49	0	5.0	-0.6
GAF	46	2	4	1.5	-0.6	46	0	4	0	6.1	0.2
GCO	420	1	11	1.5	-0.1	411	0	100	0	9.8	2.2
GEV	20	0	0	3.0	2.7	20	0	0	0	4.5	0.4
GOJ	72	0	3	1.2	0.4	71	0	3	0	4.1	1.2
GRL	70	0	0	1.2	0.3	63	0	0	0	3.9	0.4
GTI	268	0	16	1.7	-0.2	271	0	15	0	6.6	0.5
GVA	50	0	0	1.1	-0.1	48	0	0	0	3.9	0.2
GVB	49	0	0	1.3	0.5	47	0	0	0	4.3	0.8
GVF	30	0	0	1.3	-0.8	28	0	0	0	4.2	0.2
GVG	40	0	3	1.4	-0.3	39	0	3	0	3.9	0.6
GVH	34	0	3	1.0	-0.2	32	0	3	0	4.3	1.3
GVL	47	0	0	1.1	0.1	46	0	0	0	4.9	1.2
GVR	160	0	1	1.4	-0.1	153	0	1	0	4.8	0.7
GVW	35	0	0	1.3	-0.5	34	0	0	0	4.2	1.3
GVX	50	0	0	1.3	0.2	48	0	0	0	4.0	0.5
GWW	53	0	4	1.5	0.0	51	0	4	0	3.1	0.7
GYM	21	0	5	1.1	0.3	20	0	5	0	3.1	-0.3
HAL	4648	0	39	1.1	-0.1	4578	0	40	0	6.0	0.4
HRH	124	0	65	1.3	0.0	123	0	64	0	5.7	0.8
IBE	2859	1	5	1.7	0.4	1856	0	6	0	7.7	0.2
ICE	796	1	3	1.4	-0.2	771	0	3	0	5.8	0.7
IWD	221	1	6	1.5	0.1	151	0	4	0	6.3	0.2
JAA	80	1	1	2.0	1.4	76	0	0	0	5.8	2.4
JAL	1977	0	4	1.7	0.5	1956	0	5	0	8.0	0.3
JAZ	895	0	4	1.7	1.0	885	0	5	0	8.0	-0.1
JBU	51	0	0	0.8	-0.1	50	0	4	0	6.0	-1.1
KAI	21	0	43	2.1	1.8	21	0	48	0	5.7	-0.6
KAL	2469	1	9	1.7	-0.1	2465	0	10	0	8.2	0.4
KLM	1609	0	7	1.6	0.0	1374	0	7	0	7.2	0.5
LAN	521	1	5	1.7	-0.1	524	0	5	0	6.4	0.9
LAP	102	0	49	2.9	1.5	97	1	45	0	7.9	1.6
LDI	485	1	5	1.4	-0.4	382	0	4	0	7.2	0.0
LOT	104	2	11	1.9	-1.2	97	0	9	0	9.9	-0.2
LTU	749	1	5	1.5	-0.2	641	0	5	0	6.8	0.3
LXJ	28	0	46	1.7	0.9	24	0	46	0	6.2	0.1
LXR	21	5	14	2.1	-1.0	24	0	17	0	6.2	1.3
MAS	292	1	8	2.2	0.1	286	0	5	0	6.7	-0.1
MON	117	0	5	1.6	0.1	99	0	5	0	8.1	0.5
MPD	293	0	1	1.6	0.5	194	0	1	0	6.6	0.8
MPH	542	0	3	1.7	-1.1	508	0	3	0	7.0	-0.2
MYT	285	1	2	1.4	-0.1	261	0	3	0	7.4	1.1
NAO	338	0	42	1.5	-0.2	335	0	41	0	4.9	0.2
NCA	1026	0	3	1.6	-0.1	765	0	5	0	7.4	-0.2
NWA	8522	0	10	1.6	0.1	8535	0	10	0	7.4	0.3
NZL	2402	0	9	1.2	-0.1	2402	0	9	0	5.0	0.3
OAE	507	1	39	1.3	-0.3	506	0	41	0	7.7	1.1
PAC	487	0	14	1.7	-0.1	493	0	13	0	6.7	0.0
PAL	1403	0	9	1.4	-0.2	1332	0	11	0	8.3	0.3
PAO	363	0	60	1.3	0.1	366	0	60	0	8.8	0.2
PUA	27	0	33	2.0	1.1	23	0	57	0	20.9	-8.5
QFA	2422	0	53	1.3	0.3	2409	0	53	0	6.0	0.5
RAM	205	0	5	1.5	0.0	124	1	100	0	10.7	-0.6
RCH	414	2	20	2.9	0.6	337	1	100	0	10.4	1.3
RJA	48	10	10	1.5	-0.2	50	2	4	0	6.4	0.5

	TEMPERATURE					WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
ROM	30	0	0	1.2	-0.9	30	0	0	0	7.2	1.1
RZO	435	0	3	1.6	-0.4	246	0	2	0	6.6	0.6
SAA	364	1	2	1.3	-0.6	303	0	2	0	7.8	-0.1
SEU	110	1	1	1.1	0.0	106	0	1	0	7.5	-0.3
SIA	228	0	4	1.3	0.2	228	0	4	0	5.1	0.2
SLR	234	1	6	1.1	-0.2	218	0	6	0	6.3	0.0
SQC	53	0	4	1.3	0.2	52	0	4	0	5.3	-0.4
SSV	27	0	11	2.6	0.5	25	0	8	0	7.5	1.0
TAG	40	0	40	2.1	-1.0	41	0	39	0	4.9	0.4
TAM	44	2	39	3.1	1.7	43	0	35	0	12.0	1.2
TAP	546	1	6	1.3	-0.2	261	0	9	0	7.1	0.1
TCX	72	0	3	0.8	0.1	59	2	5	0	7.2	0.3
THA	83	0	1	1.5	0.1	83	0	0	0	5.0	-0.1
THT	103	0	35	2.1	0.7	96	0	33	0	7.9	1.1
TPA	29	0	0	0.7	0.4	24	0	0	0	4.6	-0.5
TSC	174	1	1	1.8	-0.4	160	1	2	0	6.7	0.4
UAL	120896	0	93	1.1	-0.2	120954	0	93	0	5.1	0.3
UPS	2031	1	56	1.5	0.0	2015	0	56	0	7.2	0.3
USA	71	3	6	1.2	0.4	67	0	3	0	9.2	-0.2
VIR	206	1	4	1.7	-0.1	199	0	6	0	9.3	0.1
VPB	20	0	5	1.7	0.8	22	0	5	0	5.6	0.6
VRG	206	3	27	2.3	0.5	202	1	58	0	11.4	1.4
VVJ	32	0	13	2.4	-0.2	35	0	17	0	11.5	-0.4
VVR	47	2	26	1.9	0.7	45	0	27	0	8.8	0.7
WOA	464	0	8	1.5	0.1	449	1	11	0	8.1	0.8
YSS	90	0	9	1.6	0.5	68	0	13	0	9.1	-1.1
9VS	125	0	3	1.5	0.0	125	0	3	0	4.4	0.9
AR	875	0	100	3.0	2.8	874	0	5	0	5.6	1.0
AU	35034	0	9	1.2	0.5	35042	0	9	0	5.4	0.6
EU	148278	0	23	1.2	0.2	148276	0	23	0	4.4	0.4
KL	4179	0	5	1.2	0.7	4169	0	5	0	5.8	0.8
LN	29	0	34	1.4	0.4	31	3	45	0	11.5	1.6
MK	4385	0	67	1.7	1.3	4347	0	7	0	6.6	1.2
SA	1670	0	5	2.0	1.7	1664	0	5	0	6.0	0.7
SV	46	0	100	1.8	1.6	46	0	100	0	9.7	1.9
N	2709	0	14	1.7	0.2	2660	0	13	0	5.1	1.1
US ACARS	781606	0	60	1.2	0.3	781598	0	60	0	5.6	0.6

TABLE 4B

MONTHLY MONITORING OF AIRCRAFT OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: May 2003

Monitoring procedures

Period :One calendar month.

Data monitored :Statistics for each airline carrier.

Area monitored :90°N - 90°S, 180°W - 180°E.

Standard of comparison :Background field from UKMO global model.

Observation times :All hours combined.

Level(s) monitored :1000.0 – 300.1 hPa

Elements monitored :TEMP in °C ; WIND in m s^{-1}

Parameters monitored

:N REP. :Number of observations received excluding duplicates.

:PG :Percentage of observations with gross errors.

:PR :Percentage of observations rejected by quality control including rejections from the duplicate check.

:PC :Percentage of observations with calm winds.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors in Temperature & vector wind.

:BIAS :Mean difference of observations from background values excluding those with gross errors in Temperature & Wind Speed.

GROSS ERROR LIMITS :10.0 °C ; 60 m s^{-1} Vector Wind

SELECTION CRITERIA :N REP ≥ 20

NB: All American ACARS data are grouped together and statistics are shown at the bottom of the table as "US ACARS".

	TEMPERATURE					WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
AAH	22	0	32	3.5	-1.6	21	0	24	0	7.2	1.3
AAL	80	0	35	1.7	0.2	79	0	33	0	5.1	1.0
ACA	29	7	28	0.8	0.3	27	0	26	0	9.9	2.0
AFR	56	2	2	1.3	0.1	59	0	5	0	6.7	0.6
AMT	27	0	37	1.2	-0.1	26	0	38	0	5.1	1.0
ANZ	177	3	29	1.1	-0.1	178	1	29	0	6.8	0.7
ATN	46	0	100	3.7	-2.3	45	0	33	0	7.8	3.5
AXF	49	0	61	0.8	0.2	49	0	61	0	3.8	-0.7
BAF	28	0	0	1.1	0.3	26	0	4	0	6.8	-0.5
CFC	78	3	9	1.4	0.1	72	1	6	0	5.6	0.7
CKS	86	0	10	2.8	1.5	85	0	12	0	11.3	0.4
CLX	26	0	4	1.7	-1.3	27	0	7	0	10.8	0.7
DAF	24	0	0	1.4	-0.6	20	0	0	0	4.8	0.9
DAL	63	0	41	2.2	-0.4	64	0	38	0	5.2	1.8
DHL	30	10	100	6.9	-6.8	30	0	23	0	21.1	4.9
DLH	176	1	15	1.4	-0.1	174	1	18	0	8.0	0.3
EIA	78	0	60	2.3	1.3	71	0	100	0	20.0	3.2
FDX	414	0	28	1.1	0.3	409	0	28	0	8.3	0.2
GAF	77	1	3	1.8	0.2	72	0	6	0	8.8	1.1
GCO	125	1	9	1.4	-0.2	127	0	100	0	11.4	2.0
HAL	70	3	43	1.5	-0.6	68	0	40	0	5.3	0.7
IBE	28	0	7	1.6	0.2	22	0	9	0	7.6	-0.6
JAL	25	4	8	1.4	0.2	27	0	4	0	7.4	-1.5
JAZ	61	0	2	1.5	0.9	60	2	3	0	5.7	0.2
KAL	42	5	21	1.3	-0.6	42	0	21	0	6.2	0.7
KIW	56	0	34	2.6	0.8	56	0	36	0	6.7	-0.1
KLM	50	2	8	1.9	-0.4	42	0	5	0	7.8	-0.2
MAS	21	0	24	1.7	-0.2	21	0	24	0	6.4	0.7
MPH	57	2	4	1.4	-0.6	61	0	3	0	6.0	-0.2
NCA	76	0	1	1.6	-0.2	67	0	3	0	8.6	0.1
NWA	196	2	12	1.4	-0.1	194	0	12	0	8.6	0.0
NZL	12178	0	52	1.3	0.4	12178	0	52	0	4.8	-0.2
PAC	42	0	0	1.4	0.7	42	0	5	0	6.4	0.9
PAL	30	0	13	1.2	-0.2	28	0	18	0	9.3	1.7
QFA	214	0	47	1.3	0.2	215	0	46	0	6.2	1.2
RCH	44	5	32	4.5	0.1	37	0	100	0	10.6	2.5
RRR	24	0	38	4.9	4.4	22	0	9	0	13.0	0.2
SIA	26	0	0	0.8	0.1	26	0	0	0	4.7	0.2
UAL	282610	0	99	1.2	-0.1	282218	0	99	0	4.4	0.3
UPS	154	1	45	1.3	-0.2	147	0	45	0	6.8	0.2
VVP	20	5	25	3.7	0.1	23	0	26	0	10.8	1.7
WOA	123	1	11	1.0	0.3	121	0	12	0	8.6	1.4
AR	460	0	100	2.1	1.8	456	0	42	0	4.7	0.8
AU	27447	0	48	1.0	0.3	27451	0	49	0	4.1	-0.1
EU	545128	0	67	1.0	0.3	542250	0	67	0	3.8	-0.1
KL	2737	0	56	1.5	0.6	2727	0	56	0	4.8	0.4
MK	2383	0	85	1.5	0.8	2359	0	52	0	4.7	0.7
SA	605	0	51	1.7	1.4	602	0	52	0	4.5	0.4
SV	61	0	100	3.7	3.3	61	0	100	0	4.3	1.3
N	41	2	34	2.9	0.6	40	0	33	0	15.1	-1.1
US ACARS	1534778	0	78	1.2	0.3	1529292	0	78	0	4.4	0.3

Figure 3a. AIRCRAFT 300 - 150 hPa mean daily count. MAY 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Global average number of observations in 24 hours = 37997

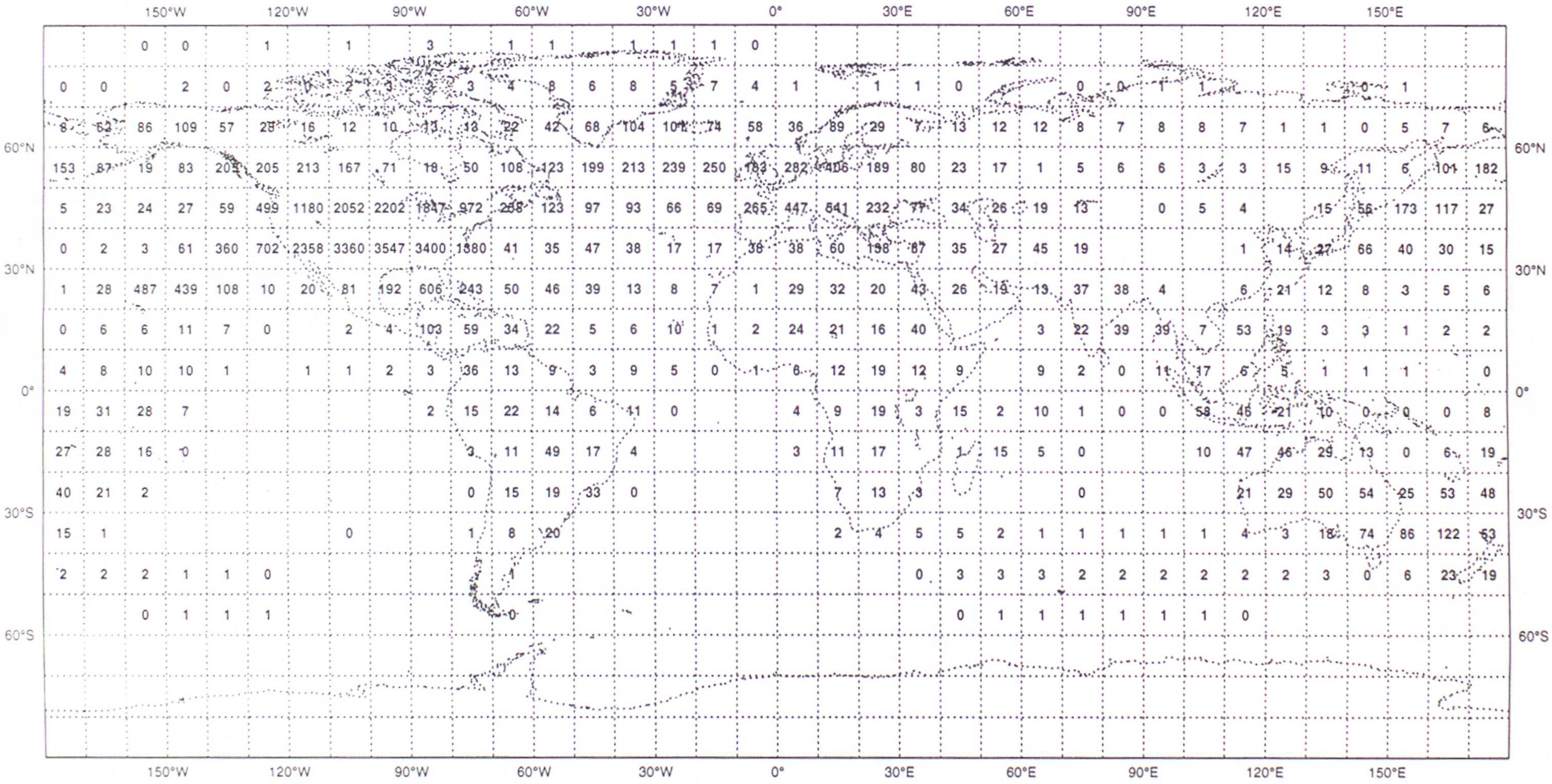

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
0 0 1 1 3 1 1 1 1 1 0
0 0 2 0 2 2 3 3 4 8 6 8 5 7 4 1 1 1 0 0 0 1 1 0 1
8 62 86 109 57 28 16 12 10 13 13 22 42 68 104 104 74 58 36 89 29 7 13 12 12 8 7 8 8 7 1 1 0 5 7 6
153 87 19 83 205 205 213 167 71 18 50 108 123 199 213 239 250 183 282 406 189 80 23 17 1 5 6 6 3 3 15 9 11 6 101 182
5 23 24 27 59 499 1180 2052 2202 1847 972 258 123 97 93 66 69 265 447 541 232 77 34 26 19 13 0 5 4 15 56 173 117 27
0 2 3 61 360 702 2358 3360 3547 3400 1880 41 35 47 38 17 17 36 38 60 198 87 35 27 45 19 1 14 27 66 40 30 15
1 28 487 439 108 10 20 81 192 606 243 50 46 39 13 8 7 1 29 32 20 43 26 19 13 37 38 4 6 21 12 8 3 5 6
0 6 6 11 7 0 2 4 103 59 34 22 5 6 10 1 2 24 21 16 40 3 22 39 39 7 53 19 3 3 1 2 2
4 8 10 10 1 1 1 2 3 36 13 9 3 9 5 0 1 6 12 19 12 9 9 2 0 11 17 6 5 1 1 1 0
19 31 28 7 2 15 22 14 6 11 0 4 9 19 3 15 2 10 1 0 0 58 46 21 10 0 0 0 8
27 28 16 0 3 11 49 17 4 3 11 17 1 15 5 0 10 47 46 29 13 0 6 19
40 21 2 0 15 19 33 0 7 13 3 0 21 29 50 54 25 53 48
15 1 0 1 8 20 2 4 5 5 2 1 1 1 1 1 4 3 18 74 86 122 53
2 2 2 1 1 0 1 0 3 3 3 2 2 2 2 2 2 3 0 6 23 19
0 1 1 1 0 0 1 1 1 1 1 1 0

Figure 3b. AIRCRAFT 1000 - 301 hPa mean daily count. MAY 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Global average number of observations in 24 hours = 77513

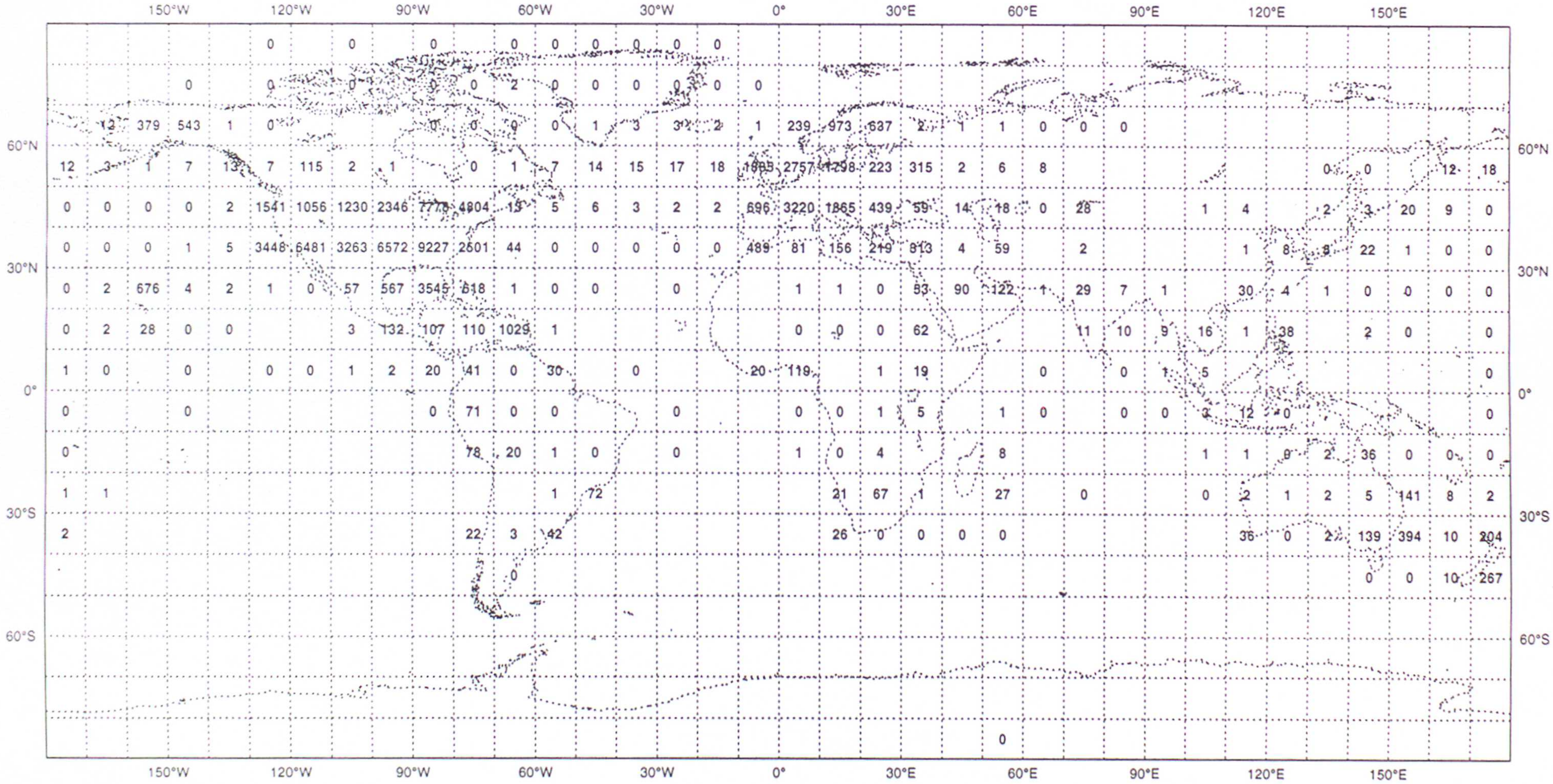

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
0 0 0 0 0 0 0 0 0
0 0 0 0 0 2 0 0 0 0 0 0
12 379 543 1 0 0 0 0 0 1 3 3 2 1 239 973 637 2 1 1 0 0 0
12 3 1 7 13 7 115 2 1 0 1 7 14 15 17 18 1885 2757 1298 223 315 2 6 8 0 0 12 18
0 0 0 0 2 1541 1056 1230 2346 7778 4804 13 5 6 3 2 2 696 3220 1865 439 59 14 18 0 28 1 4 2 3 20 9 0
0 0 0 1 5 3448 6481 3263 6572 9227 2601 44 0 0 0 0 0 489 81 156 219 813 4 59 2 1 8 8 22 1 0 0
0 2 676 4 2 1 0 57 567 3545 618 1 0 0 0 1 1 0 53 90 122 1 29 7 1 30 4 1 0 0 0 0
0 2 28 0 0 3 132 107 110 1029 1 0 0 0 62 11 10 9 16 1 38 2 0 0
1 0 0 0 0 1 2 20 41 0 30 0 20 119 1 19 0 0 1 5 0
0 0 0 71 0 0 0 0 0 1 5 1 0 0 0 3 12 0 0
0 78 20 1 0 0 1 0 4 8 1 1 8 2 36 0 0 0
1 1 1 72 21 67 1 27 0 0 2 1 2 5 141 8 2
2 22 3 42 26 0 0 0 0 36 0 2 139 394 10 204
0 0 0 10 267
0

Figure 4a. AIRCRAFT 300 - 150 hPa mean winds. MAY 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Arrows are plotted where greater than 30 obs are present

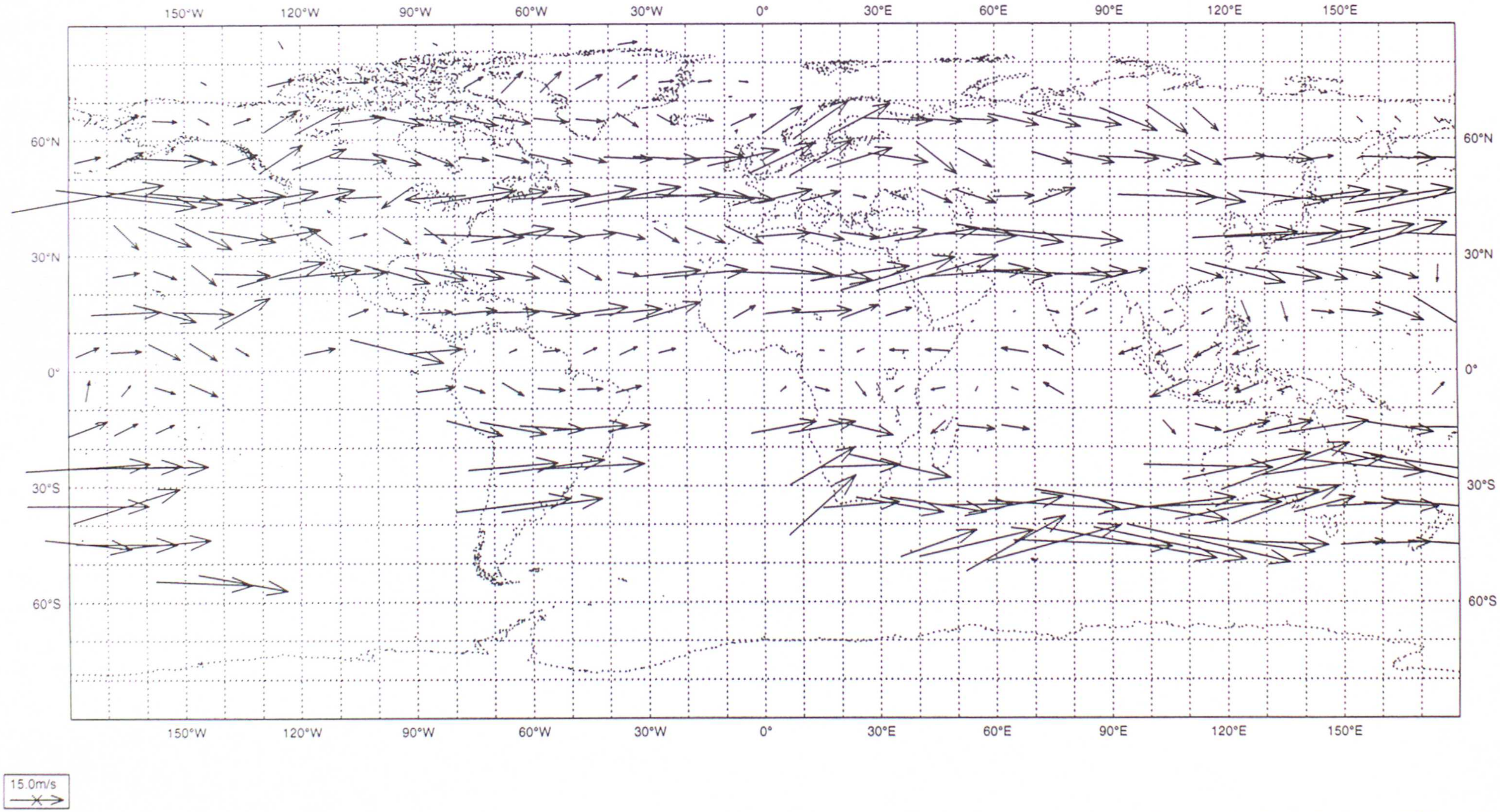

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0m/s

Figure 4b. AIRCRAFT 1000 - 301 hPa mean winds. MAY 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Arrows are plotted where greater than 30 obs are present

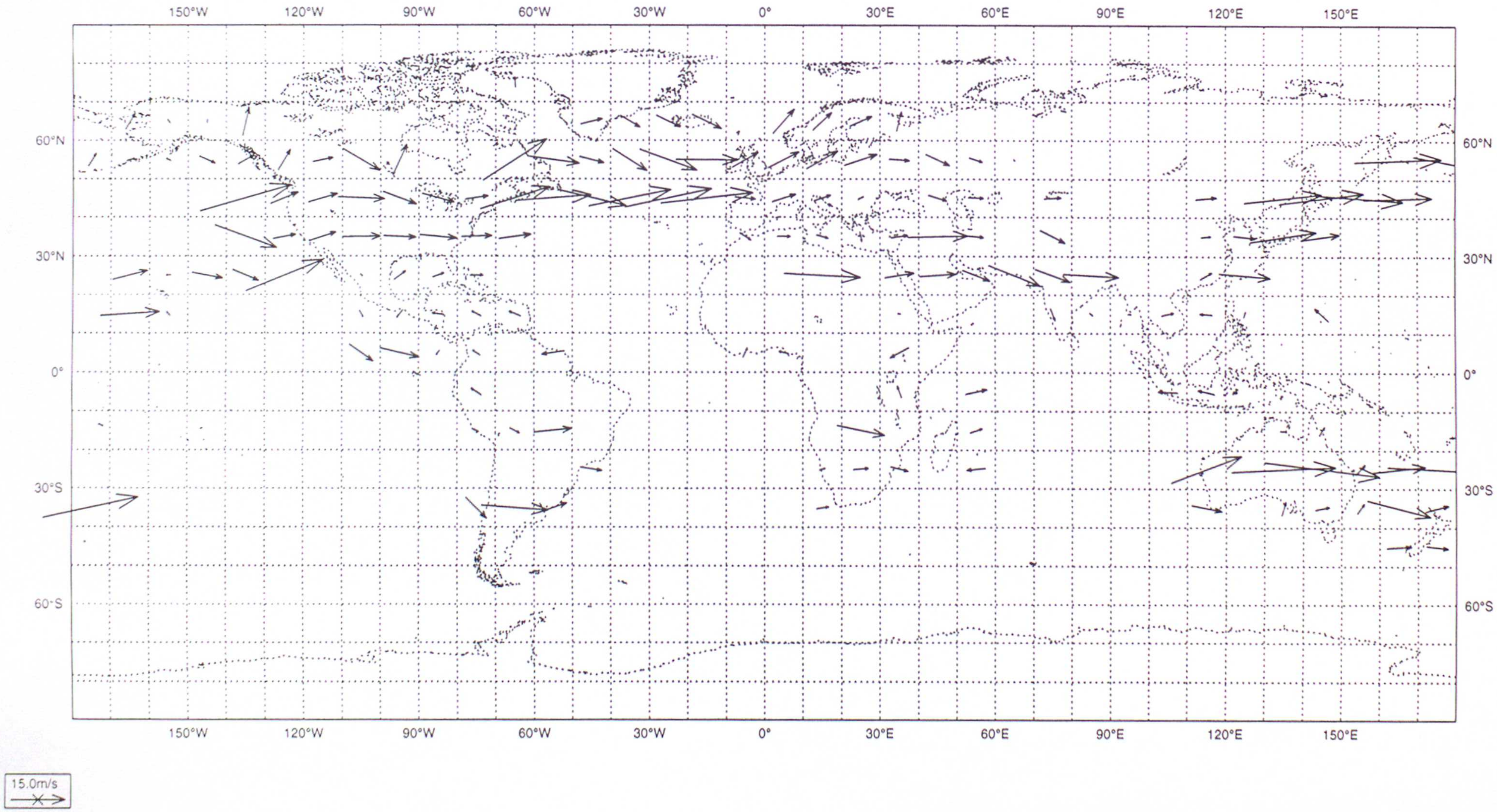

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0m/s

Figure 5a. AIRCRAFT 300 - 150 hPa mean O-B winds. MAY 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Arrows are plotted where greater than 30 obs are present

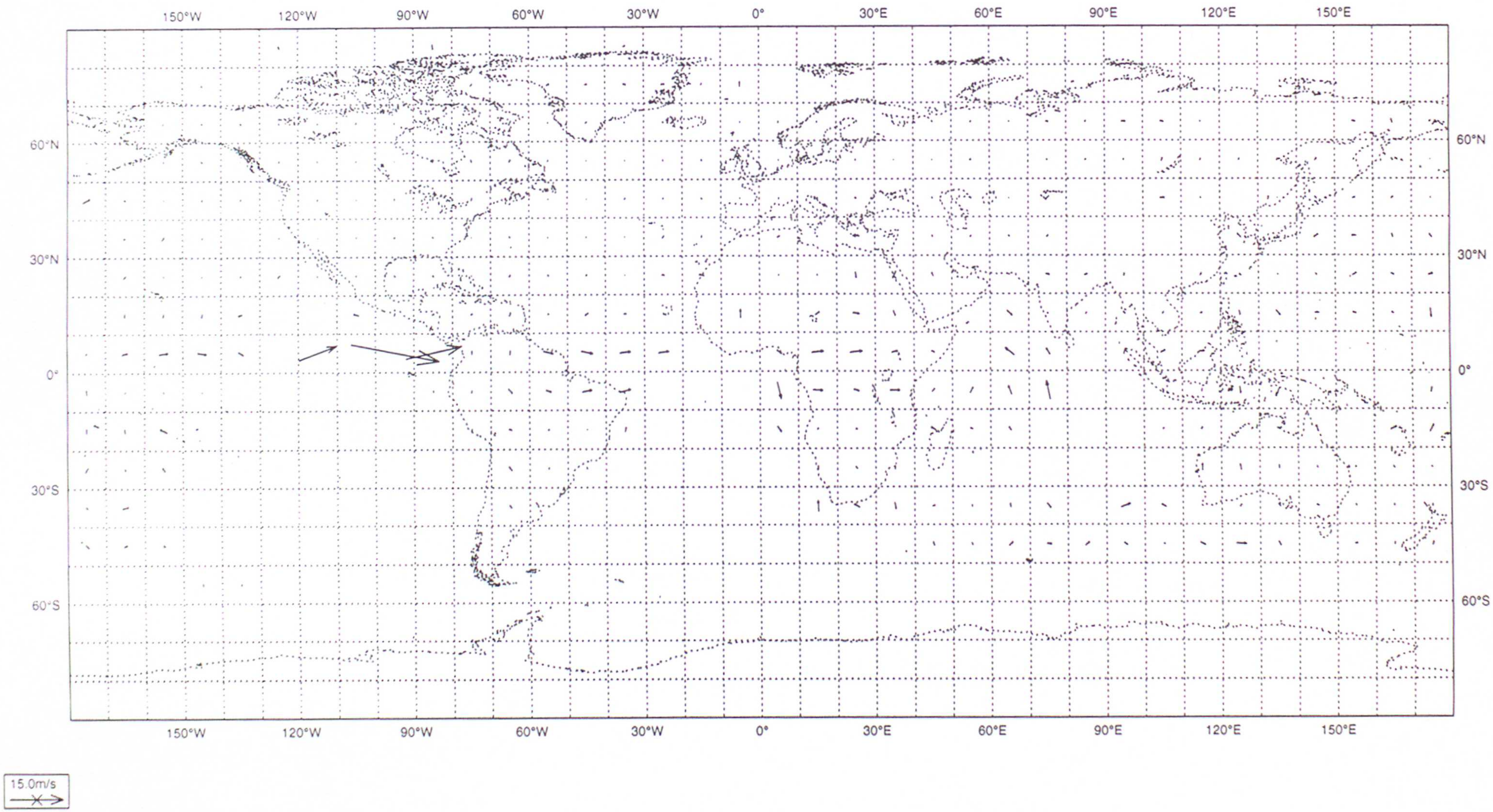

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0m/s

Figure 5b. AIRCRAFT 1000 - 301 hPa mean O-B winds. MAY 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Arrows are plotted where greater than 30 obs are present

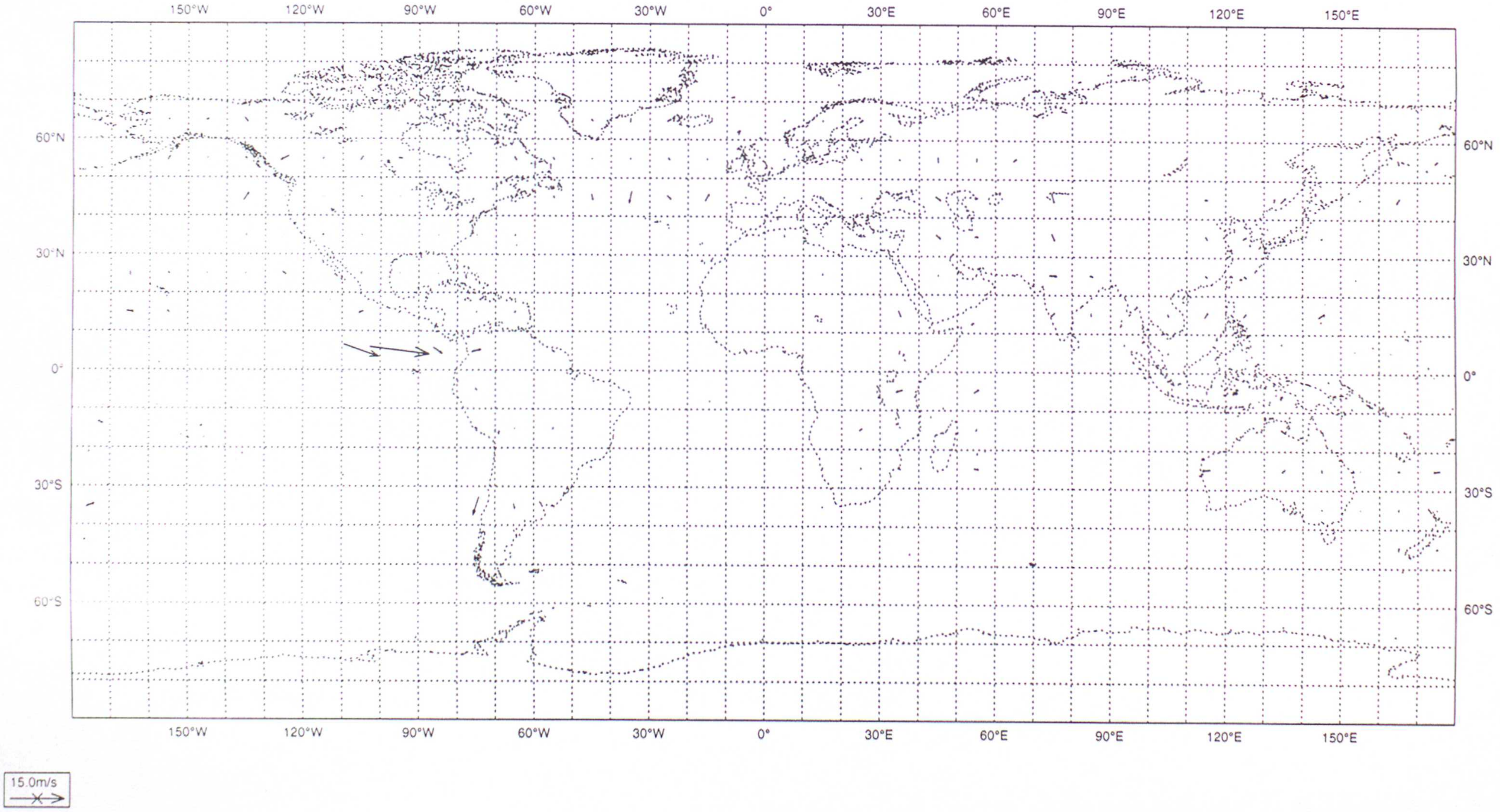

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0m/s

Figure 6a. AIRCRAFT 300 - 150 hPa mean O-B speeds (ms-1). MAY 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Values are printed where greater than 30 obs are present

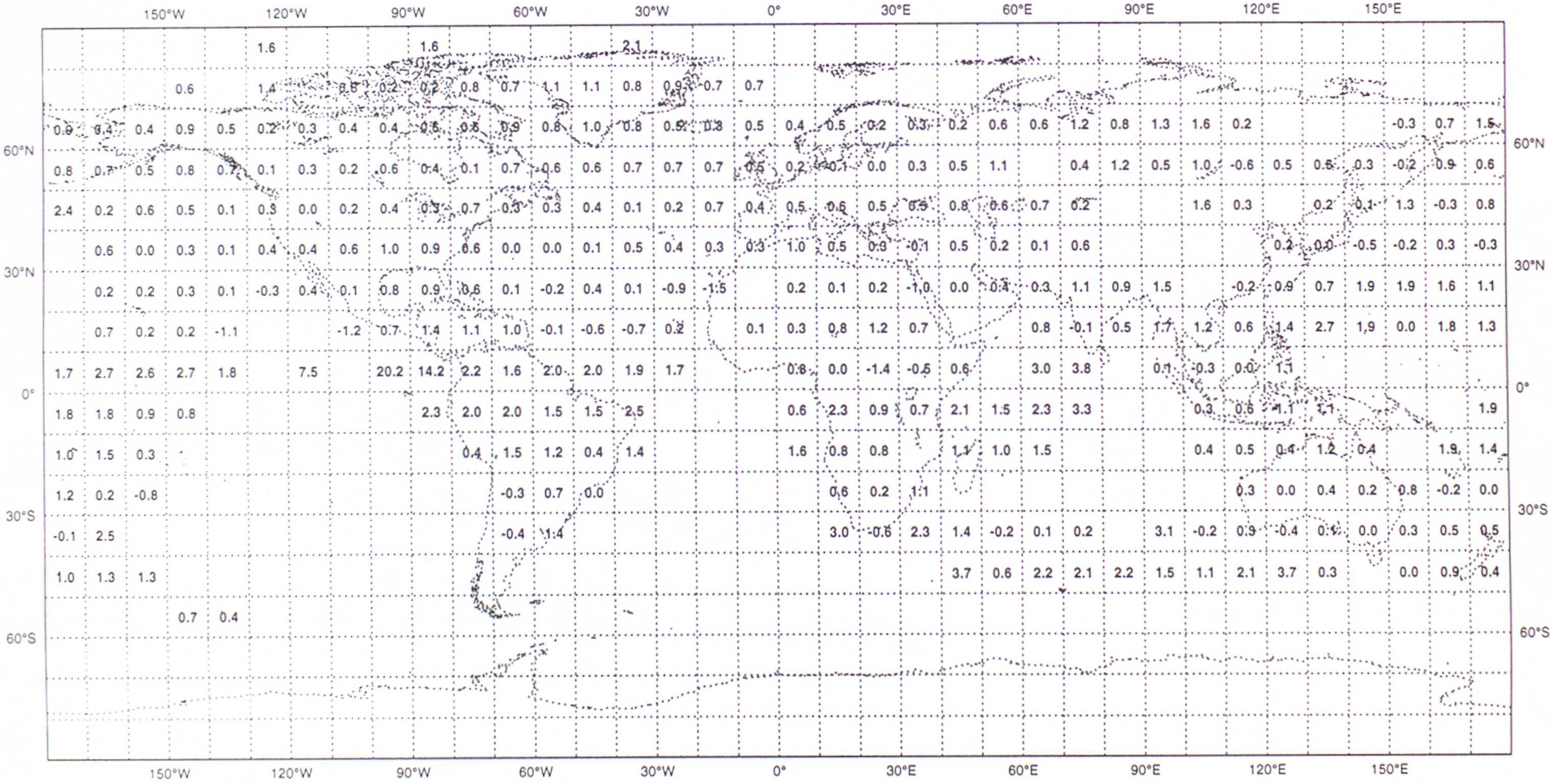

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
1.6 1.6 2.1
0.6 1.4 0.6 0.2 0.2 0.8 0.7 1.1 1.1 0.8 0.9 -0.7 0.7
0.9 0.4 0.4 0.9 0.5 0.2 0.3 0.4 0.4 0.6 0.6 0.9 0.8 1.0 0.8 0.5 0.3 0.5 0.4 0.5 0.2 0.3 0.2 0.6 0.6 1.2 0.8 1.3 1.6 0.2 -0.3 0.7 1.5
0.8 0.7 0.5 0.8 0.7 0.1 0.3 0.2 0.6 0.4 0.1 0.7 -0.6 0.6 0.7 0.7 0.7 0.5 0.2 -0.1 0.0 0.3 0.5 1.1 0.4 1.2 0.5 1.0 -0.6 0.5 0.6 0.3 -0.2 0.9 0.6
2.4 0.2 0.6 0.5 0.1 0.3 0.0 0.2 0.4 0.3 0.7 0.3 0.3 0.4 0.1 0.2 0.7 0.4 0.5 0.6 0.5 0.5 0.8 0.6 0.7 0.2 1.6 0.3 0.2 0.1 1.3 -0.3 0.8
0.6 0.0 0.3 0.1 0.4 0.4 0.6 1.0 0.9 0.6 0.0 0.0 0.1 0.5 0.4 0.3 0.3 1.0 0.5 0.3 -0.1 0.5 0.2 0.1 0.6 0.2 0.0 -0.5 -0.2 0.3 -0.3
0.2 0.2 0.3 0.1 -0.3 0.4 0.1 0.8 0.9 0.6 0.1 -0.2 0.4 0.1 -0.9 -1.5 0.2 0.1 0.2 -1.0 0.0 0.4 0.3 1.1 0.9 1.5 -0.2 0.9 0.7 1.9 1.9 1.6 1.1
0.7 0.2 0.2 -1.1 -1.2 0.7 1.4 1.1 1.0 -0.1 -0.6 -0.7 0.2 0.1 0.3 0.8 1.2 0.7 0.8 -0.1 0.5 1.7 1.2 0.6 1.4 2.7 1.9 0.0 1.8 1.3
1.7 2.7 2.6 2.7 1.8 7.5 20.2 14.2 2.2 1.6 2.0 2.0 1.9 1.7 0.8 0.0 -1.4 -0.5 0.6 3.0 3.8 0.1 -0.3 0.0 1.1
1.8 1.8 0.9 0.8 2.3 2.0 2.0 1.5 1.5 2.5 0.6 2.3 0.9 0.7 2.1 1.5 2.3 3.3 0.3 0.6 1.1 1.1 1.9
1.0 1.5 0.3 0.4 1.5 1.2 0.4 1.4 1.6 0.8 0.8 1.1 1.0 1.5 0.4 0.5 0.4 1.2 0.4 1.9 1.4
1.2 0.2 -0.8 -0.3 0.7 0.0 0.6 0.2 1.1 0.3 0.0 0.4 0.2 0.8 -0.2 0.0
-0.1 2.5 -0.4 1.4 3.0 -0.6 2.3 1.4 -0.2 0.1 0.2 3.1 -0.2 0.9 -0.4 0.1 0.0 0.3 0.5 0.5
1.0 1.3 1.3 3.7 0.6 2.2 2.1 2.2 1.5 1.1 2.1 3.7 0.3 0.0 0.9 0.4
0.7 0.4

Figure 6b. AIRCRAFT 1000 - 301 hPa mean O-B speeds (ms-1). MAY 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Values are printed where greater than 30 obs are present

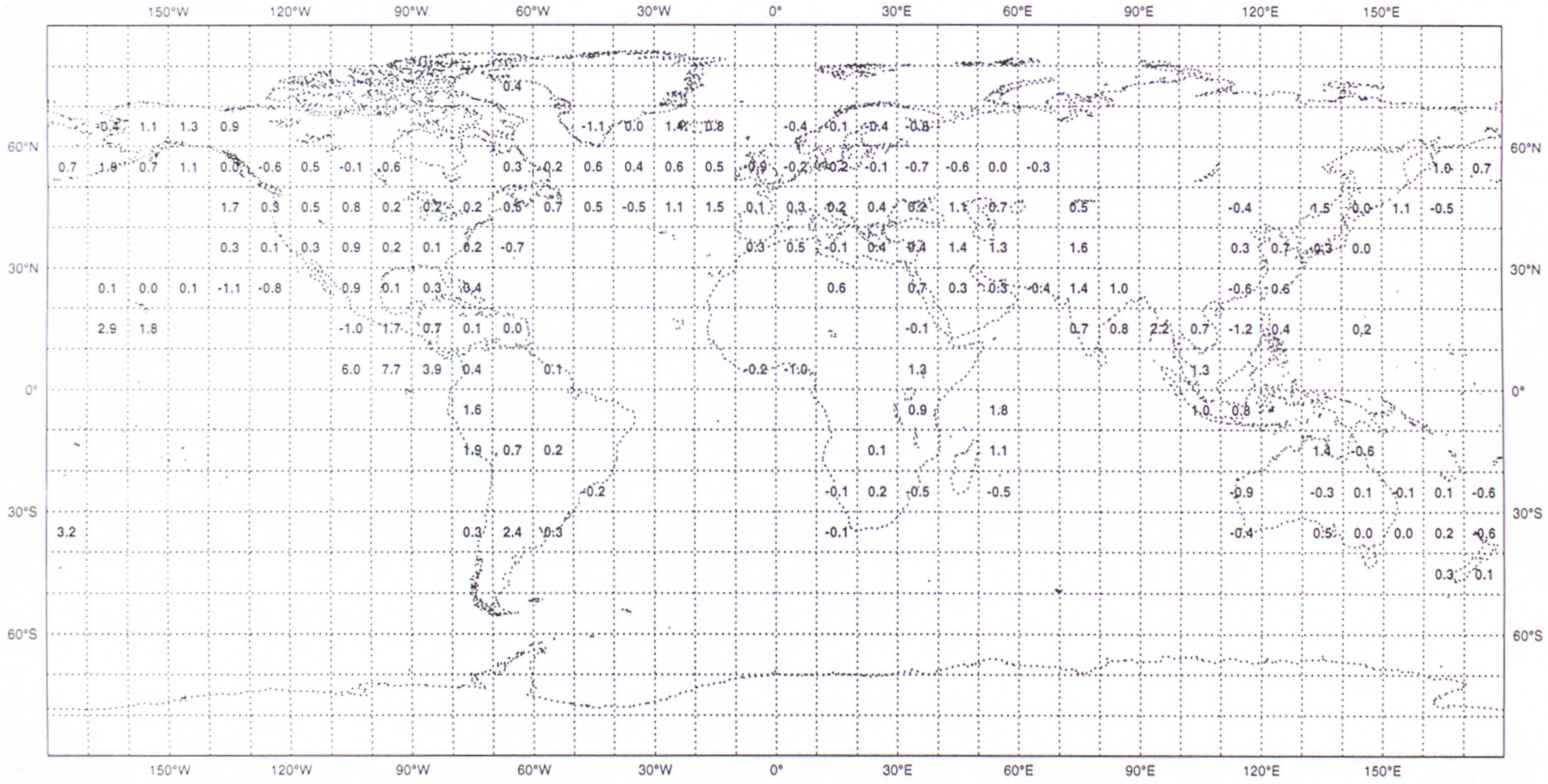
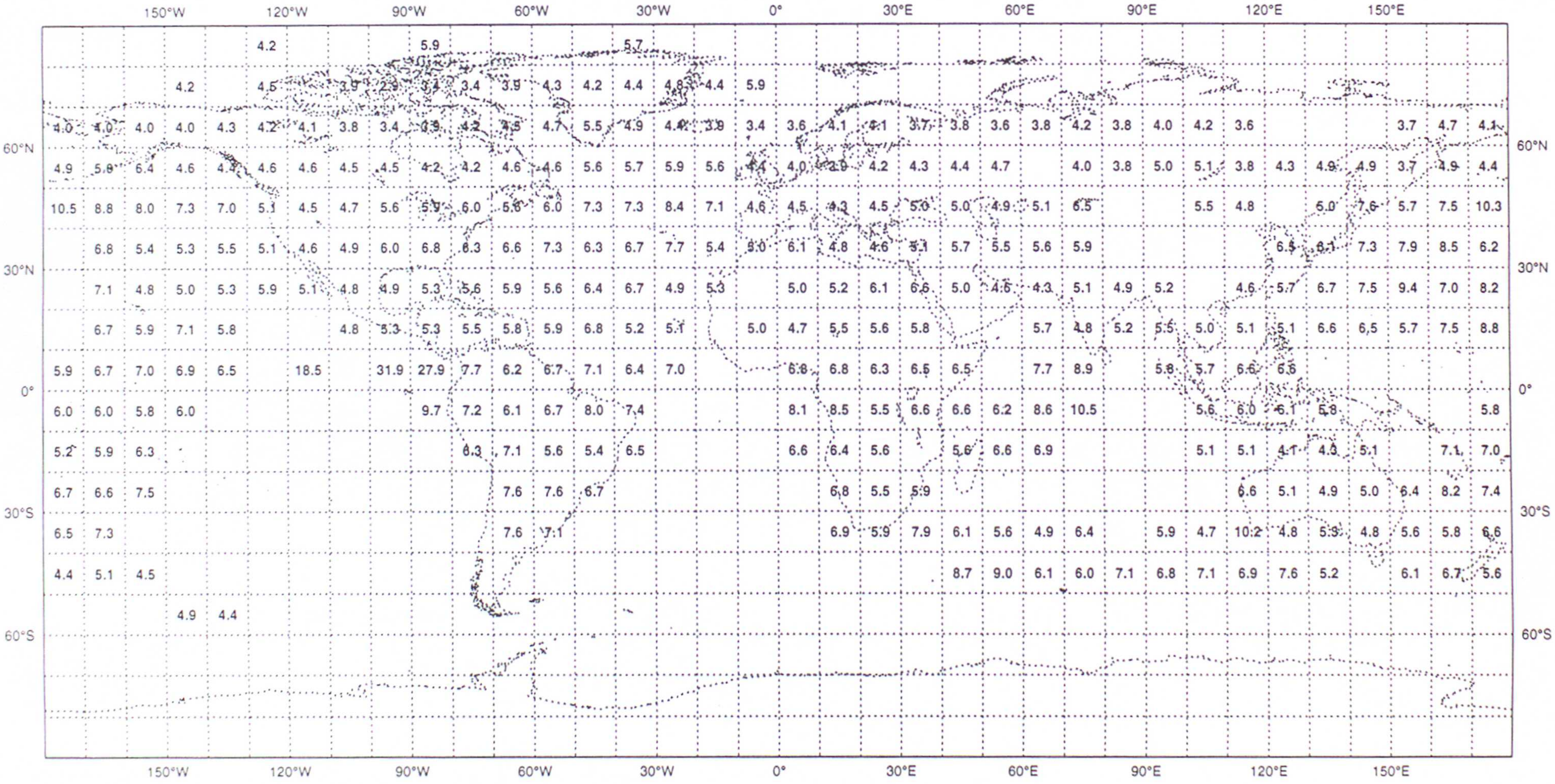

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
0.4
-0.4 1.1 1.3 0.9 -1.1 0.0 1.4 0.8 -0.4 -0.1 -0.4 -0.8
0.7 1.6 0.7 1.1 0.0 -0.6 0.5 -0.1 0.6 0.3 -0.2 0.6 0.4 0.6 0.5 -0.9 -0.2 -0.2 -0.1 -0.7 -0.6 0.0 -0.3 1.0 0.7
1.7 0.3 0.5 0.8 0.2 0.2 0.2 0.5 0.7 0.5 -0.5 1.1 1.5 0.1 0.3 0.2 0.4 0.2 1.1 0.7 0.5 -0.4 1.5 0.0 1.1 -0.5
0.3 0.1 0.3 0.9 0.2 0.1 0.2 -0.7 0.3 0.5 -0.1 0.4 0.4 1.4 1.3 1.6 0.3 0.7 0.3 0.0
0.1 0.0 0.1 -1.1 -0.8 0.9 0.1 0.3 0.4 0.6 0.7 0.3 0.3 -0.4 1.4 1.0 -0.6 0.6
2.9 1.8 -1.0 1.7 0.7 0.1 0.0 -0.1 0.7 0.8 2.2 0.7 -1.2 0.4 0.2
6.0 7.7 3.9 0.4 0.1 -0.2 -1.0 1.3 1.3
1.6 0.9 1.8 1.0 0.8
1.9 0.7 0.2 0.1 1.1 1.4 -0.6
-0.2 -0.1 0.2 -0.5 -0.5 -0.9 -0.3 0.1 -0.1 0.1 -0.6
3.2 0.3 2.4 0.3 -0.1 -0.4 0.5 0.0 0.0 0.2 -0.6
0.3 0.1

Figure 7a. AIRCRAFT 300 - 150 hPa RMS O-B vector (ms-1). MAY 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Values are printed where greater than 30 obs are present



150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 7b. AIRCRAFT 1000 - 301 hPa RMS O-B vector (ms-1). MAY 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Values are printed where greater than 30 obs are present

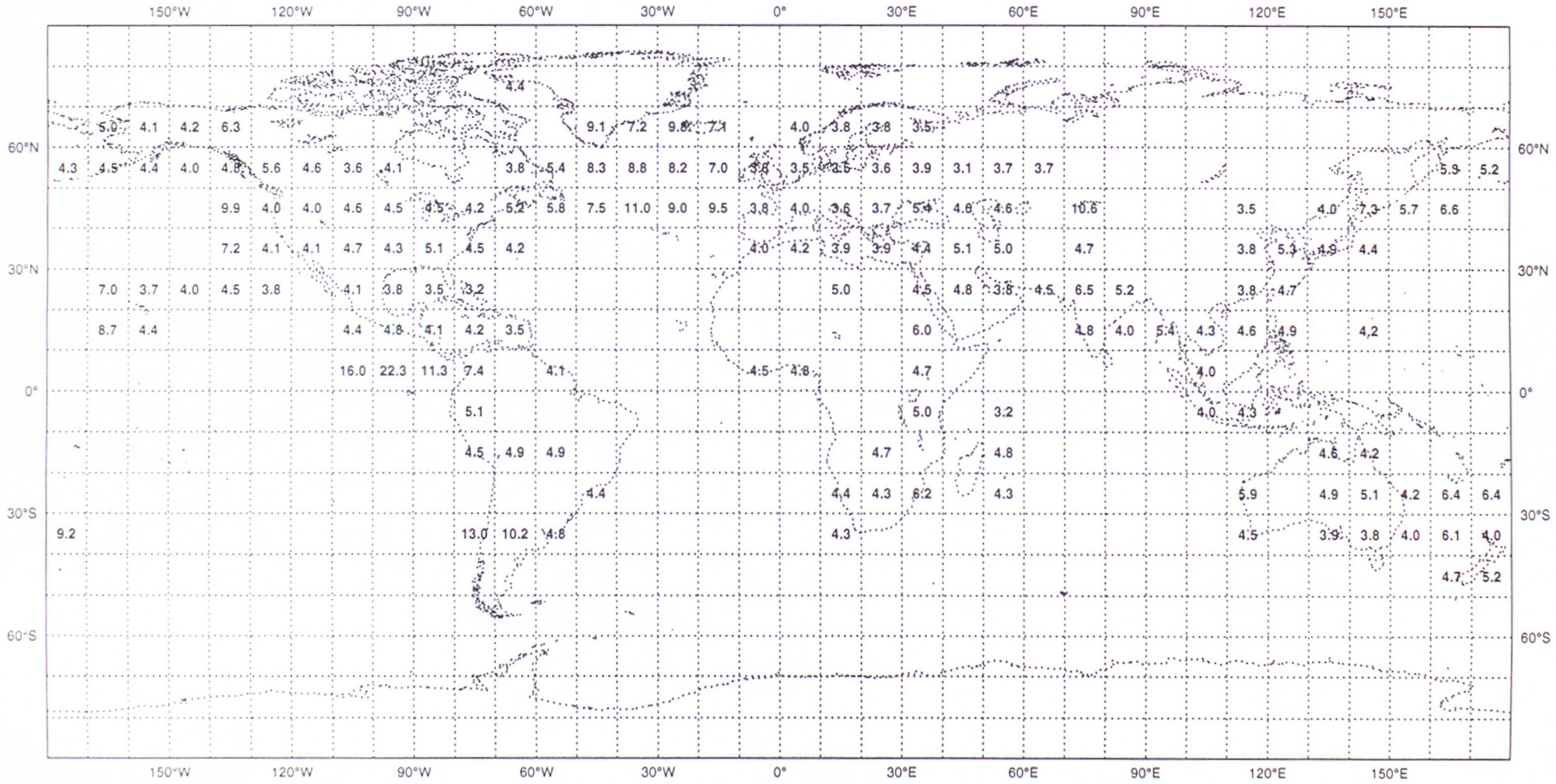

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
4.4
5.0 4.1 4.2 6.3 9.1 7.2 9.8 7.1 4.0 3.8 3.8 3.5
4.3 4.5 4.4 4.0 4.8 5.6 4.6 3.6 4.1 3.8 5.4 8.3 8.8 8.2 7.0 3.8 3.5 3.5 3.6 3.9 3.1 3.7 3.7 5.3 5.2
9.9 4.0 4.0 4.6 4.5 4.5 4.2 5.2 5.8 7.5 11.0 9.0 9.5 3.8 4.0 3.6 3.7 5.4 4.6 4.6 10.6 3.5 4.0 7.3 5.7 6.6
7.2 4.1 4.1 4.7 4.3 5.1 4.5 4.2 4.0 4.2 3.9 3.9 4.4 5.1 5.0 4.7 3.8 5.3 4.9 4.4
7.0 3.7 4.0 4.5 3.8 4.1 3.8 3.5 3.2 5.0 4.5 4.8 3.8 4.5 6.5 5.2 3.8 4.7
8.7 4.4 4.4 4.8 4.1 4.2 3.5 6.0 4.8 4.0 5.4 4.3 4.6 4.9 4.2
16.0 22.3 11.3 7.4 4.1 4.5 4.8 4.7 4.0
5.1 5.0 3.2 4.0 4.3
4.5 4.9 4.9 4.7 4.8 4.6 4.2
4.4 4.4 4.3 6.2 4.3 5.9 4.9 5.1 4.2 6.4 6.4
9.2 13.0 10.2 4.8 4.3 4.5 3.9 3.8 4.0 6.1 4.0
4.7 5.2

TABLE 5

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: May 2003

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from each unique identifier for radiosonde TEMPs.
Area monitored		:90°N - 90°S, 180°W - 180°E.
Standard of comparison		:Background field from UKMO global model.
Observation times		:00 UTC and 12 UTC.
Level(s) monitored		:Standard levels between 1000.0 - 30.0 hPa
Element monitored		:GEOPOTENTIAL HEIGHT IN metres
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:% REJ	:Percentage of observations rejected by quality control at level shown during period excluding those with gross errors.
	:SD	:SD of difference of observations from background values at level shown excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values at level shown excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values at level shown excluding those with gross errors.
	:NUM LEVELS	:Number of levels satisfying selection criteria.

GROSS ERROR LIMITS :Defined in Appendix I.1

SELECTION CRITERIA : ≥3 levels with ≥10 observations and ≥ 100 m weighted RMS.

ONLY THE WORST LEVEL IS SHOWN WITH UNWEIGHTED RMS

WMO IDENT	OBS TIME	ELM	LEV	LAT/LONG	NUM OBS	NUM GROSS	SD	BIAS	RMS	NUM LEVELS
20674	12	Z	50	73/ 80	18	2	62.7	166.8	178.2	4
34247	12	Z	50	50/ 41	24	1	71.6	187.3	200.6	8
42101	00	Z	150	30/ 76	25	0	88.4	-12.6	89.3	4
42101	12	Z	70	30/ 76	10	0	91.9	127.9	157.5	5
42339	00	Z	150	26/ 73	14	0	89.8	59.3	107.6	4
42361	12	Z	70	26/ 78	10	1	127.8	176.5	217.9	8
42369	00	Z	1000	27/ 81	1	21	0.0	-82.0	82.0	9
42369	12	Z	70	27/ 81	10	1	88.1	196.8	215.6	8
42379	00	Z	500	27/ 83	17	0	25.6	-52.1	58.0	6
42492	00	Z	1000	26/ 85	21	1	15.5	-65.1	66.9	7
42647	00	Z	70	23/ 73	12	0	110.2	118.8	162.1	5
42647	12	Z	150	23/ 73	14	1	73.6	129.4	148.8	8
42867	00	Z	30	21/ 79	11	0	192.8	183.5	266.2	10
42867	12	Z	70	21/ 79	15	0	125.6	93.5	156.6	10
42874	00	Z	50	21/ 82	11	0	105.0	182.4	210.4	4
42874	12	Z	70	21/ 82	10	2	86.0	164.6	185.7	6
42971	12	Z	1000	20/ 86	24	0	17.4	-58.7	61.2	5
43003	00	Z	1000	19/ 73	19	7	10.6	-82.1	82.7	5
43003	12	Z	1000	19/ 73	16	13	7.4	-84.2	84.5	9
43014	00	Z	200	20/ 75	18	1	114.3	-54.4	126.6	7
43041	00	Z	100	19/ 82	11	0	103.6	-82.5	132.4	6
43128	12	Z	70	17/ 78	19	0	115.4	154.7	193.0	6
43285	00	Z	100	13/ 75	18	0	92.1	-126.8	156.7	5
43295	12	Z	50	13/ 78	10	0	85.6	153.2	175.5	5
43311	00	Z	200	11/ 73	20	0	53.2	-83.1	98.7	4
43333	00	Z	50	12/ 93	12	0	93.9	162.2	187.5	4
43333	12	Z	70	12/ 93	15	0	96.2	125.3	158.0	4
43346	00	Z	30	11/ 80	11	0	81.7	211.4	226.6	4
43369	00	Z	150	8/ 73	15	0	96.8	124.8	158.0	7
43369	12	Z	150	8/ 73	18	0	70.3	145.5	161.6	7
61902	12	Z	1000	-8/ -14	18	0	24.9	21.2	32.7	5
78866	12	Z	700	18/ -63	22	0	22.6	39.4	45.4	9
78970	12	Z	70	11/ -61	9	8	96.1	243.4	261.7	11
84628	12	Z	850	-12/ -77	13	0	9.1	-54.4	55.1	4
91366	00	Z	70	9/ 168	18	0	111.0	97.5	147.7	4

Figure 8. TEMP 500 hPa geopotential mean daily count. MAY 2003
All hours
Global average number of observations in 24 hours = 1061

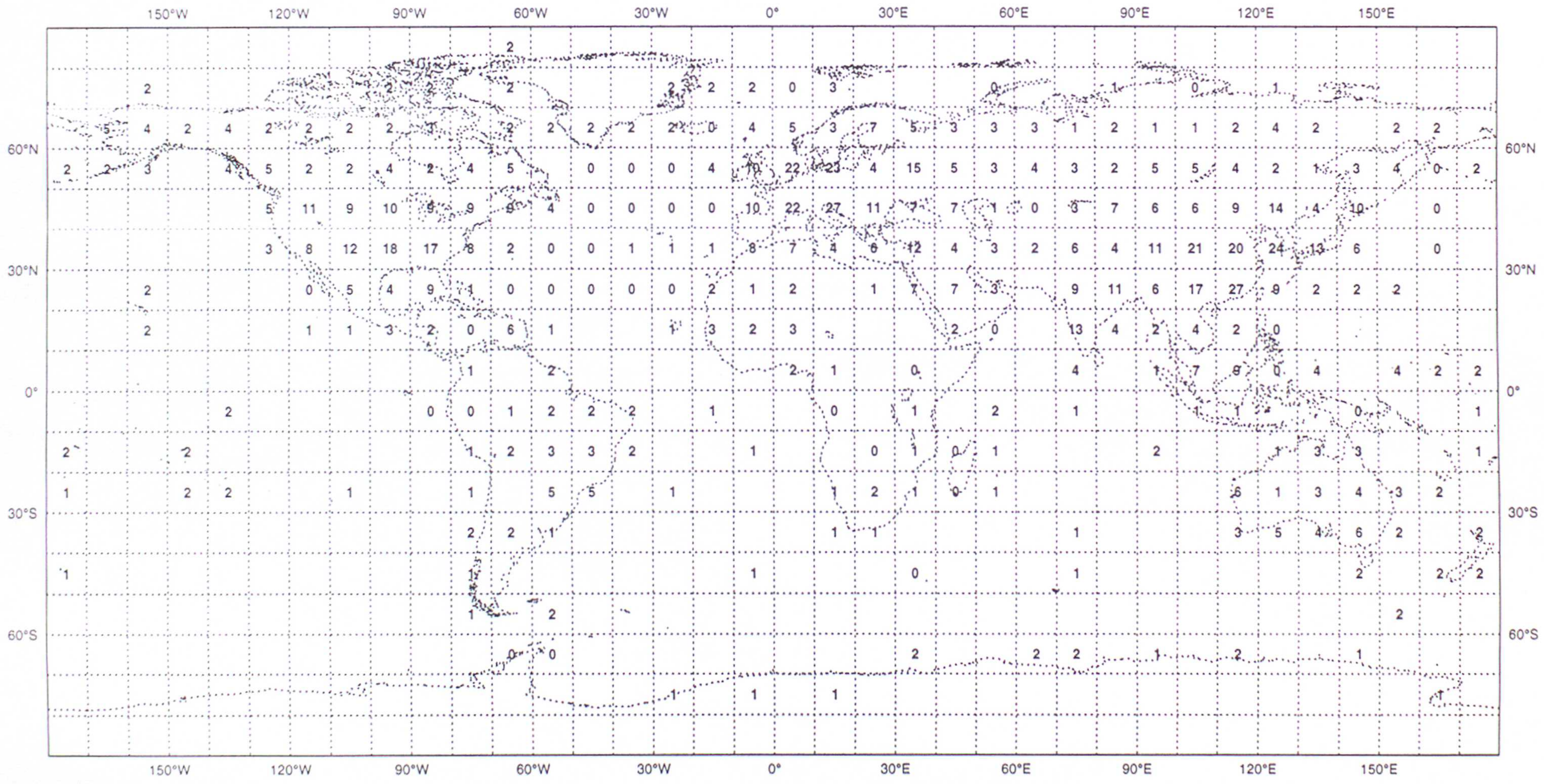

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

TABLE 6

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: May 2003

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from each unique identifier for radiosonde TEMPs.

Area monitored :90°N - 90°S, 180°W - 180°E.

Standard of comparison :Background field from UKMO global model.

Observation times :00 UTC and 12 UTC.

Level(s) monitored :Standard levels between 1000.0 - 100.0 hPa

Element monitored :VECTOR WIND in m s^{-1}

Parameters monitored

:NUM OBS :Number of observations available at level shown during period.

:NUM GROSS :Number of gross errors at level shown during period.

:% REJ :Percentage of observations rejected by quality control at level shown during period excluding those with gross errors.

:UBIAS,VBIAS :Mean difference of observations of U and V components from background values at level shown excluding those with gross errors.

:RMS :Root Mean Square difference of observations from background values at level shown excluding those with gross errors.

:NUM LEVELS :Number of levels satisfying selection criteria.

GROSS ERROR LIMITS :Defined in Appendix I.2

SELECTION CRITERIA : ≥ 10 observations and ≥ 15 m s^{-1} RMS vector wind.

ONLY THE STANDARD LEVEL BETWEEN 1000 - 100 hPa WITH HIGHEST RMS IS SHOWN

WMO IDENT	OBS TIME	ELM	LEV	LAT/LONG	NUM OBS	NUM GROSS	% REJ	UBIAS	VBIAS	RMS	LEVELS
PSPIU	00	V	100	-5/ -81	13	0	100	-11.8	-5.9	29.1	2
PSPIU	12	V	150	-5/ -81	13	0	100	-12.7	-2.4	27.2	3
40948	00	V	150	35/ 69	27	0	0	-4.0	16.8	19.5	3
40948	12	V	200	35/ 69	29	0	0	0.3	15.4	17.7	3
42182	00	V	250	29/ 77	22	0	100	-12.7	-4.6	15.3	1
42182	12	V	150	29/ 77	16	0	100	2.9	-5.7	16.2	2
42361	12	V	250	26/ 78	15	0	100	15.1	-1.8	25.9	3
42369	12	V	500	27/ 81	14	0	100	10.0	-5.1	16.2	1
42410	12	V	300	26/ 92	14	0	100	13.0	8.2	20.2	3
48568	12	V	150	7/ 101	26	0	100	5.4	6.9	15.5	1
50527	00	V	150	49/ 120	24	0	25	9.1	-3.3	17.9	1
60360	12	V	200	37/ 8	21	0	100	5.3	-3.4	21.5	3
62378	12	V	200	30/ 31	26	0	100	-2.6	-5.0	15.1	1
62423	00	V	150	27/ 28	14	0	50	-9.8	-5.2	18.7	2
68442	12	V	200	-29/ 26	14	0	50	-11.6	-1.7	17.2	2
68512	12	V	100	-30/ 18	16	0	100	1.6	0.9	15.9	1
94346	00	V	100	-23/ 144	25	0	32	15.1	-2.5	19.5	1
96035	00	V	150	4/ 99	11	0	100	7.5	0.5	16.4	1
96935	00	V	300	-7/ 113	11	0	9	4.5	2.5	15.9	1

Figure 9. TEMP/PILOT 300 hPa wind mean daily count. MAY 2003
All hours
Global average number of observations in 24 hours = 1244

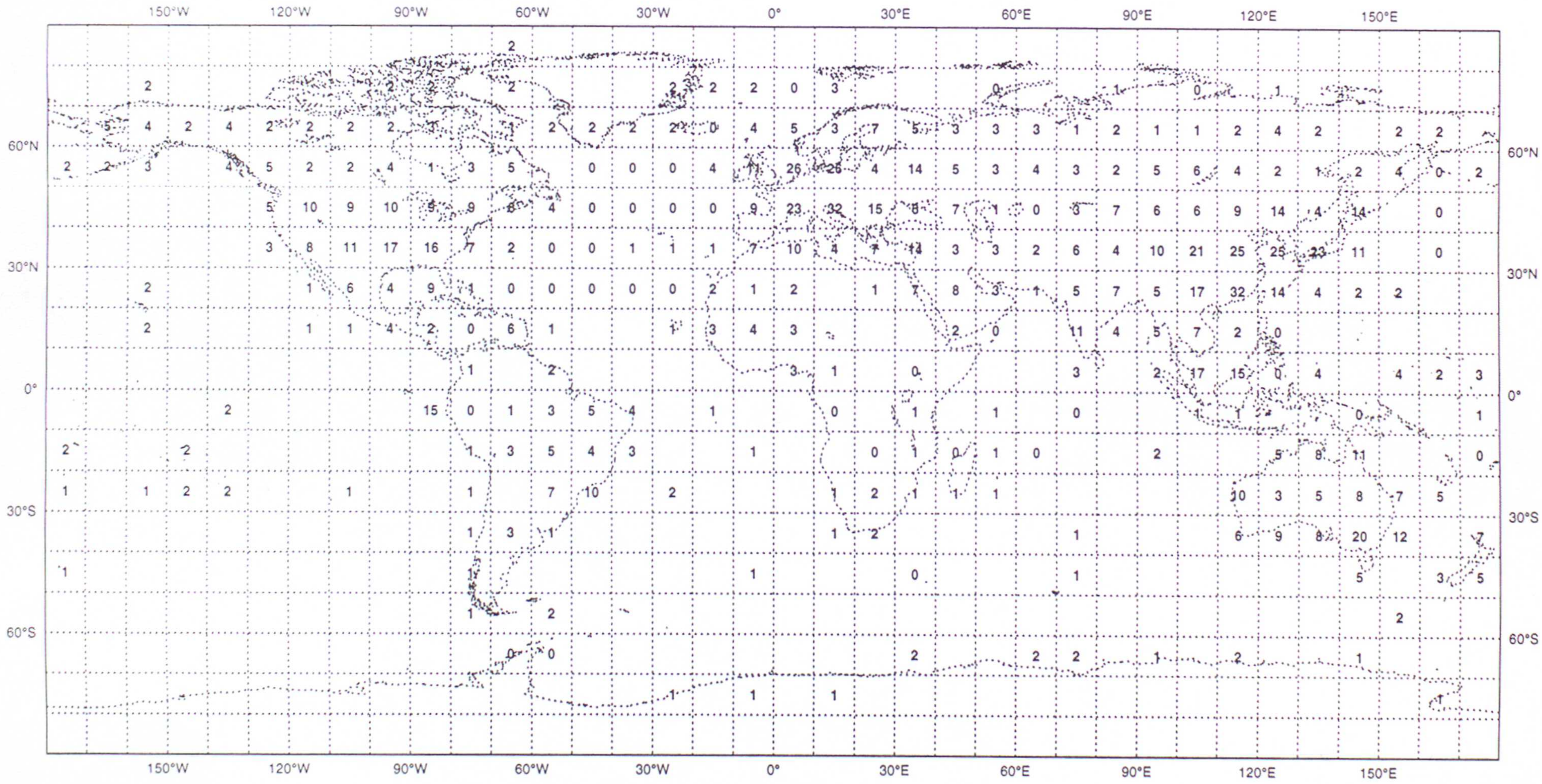

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
2
2 2 2 2 2 0 3 0 1 0 1
5 4 2 4 2 2 2 2 1 2 2 2 2 0 4 5 3 7 5 3 3 3 1 2 1 1 2 4 2 2 2
2 2 3 4 5 2 2 4 1 3 5 0 0 0 4 11 26 26 4 14 5 3 4 3 2 5 6 4 2 1 2 4 0 2
5 10 9 10 8 9 8 4 0 0 0 0 9 23 32 15 8 7 1 0 3 7 6 6 9 14 4 14 0
3 8 11 17 16 7 2 0 0 1 1 1 7 10 4 7 14 3 3 2 6 4 10 21 25 25 23 11 0
2 1 6 4 9 1 0 0 0 0 0 2 1 2 1 7 8 3 1 5 7 5 17 32 14 4 2 2
2 1 1 4 2 0 6 1 1 3 4 3 2 0 11 4 5 7 2 0
1 2 3 1 0 3 2 17 15 0 4 4 2 3
2 15 0 1 3 5 4 1 0 1 1 0 1 1 0 1
2 2 1 3 5 4 3 1 0 1 0 1 0 2 5 8 11 0
1 1 2 2 1 1 7 10 2 1 2 1 1 1 10 3 5 8 7 5
1 3 1 1 2 1 6 9 8 20 12 7
1 1 1 0 1 5 3 5
1 2 2
0 0 2 2 2 1 2 1
1 1 1 1

TABLE 7

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: May 2003

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from each unique identifier for radiosonde TEMPs.
Area monitored		:90°N - 90°S, 180°W - 180°E.
Standard of comparison		:Background field from UKMO global model.
Observation times		:00 UTC and 12 UTC.
Level(s) monitored		:Standard levels between 500.0 - 150.0 hPa
Element monitored		:WIND DIRECTION in degrees
Parameters monitored		
	:NUM OBS	:Average number of observations at all levels.
	:BIAS	:Mean difference of observations from background values from all levels.
	:MAX SPREAD	:(For observation - background values) Maximum absolute difference of SD at any level from SD at all levels
	:SD	:SD of difference of observations from background values at all levels.

SELECTION CRITERIA

:NUM OBS ≥ 5, and
ABSOLUTE BIAS ≥ 10°, with
SD < 30°, and
MAX SPREAD < 10°

WMO IDENT	OBS TIME	ELM	LAT/LONG	NUM OBS	BIAS	MAX SPREAD	SD
40948	00	DD	35/ 69	25	-24.9	7.8	12.5
40948	12	DD	35/ 69	28	-24.7	5.3	12.4
42182	00	DD	29/ 77	21	10.4	3.2	9.6
42182	12	DD	29/ 77	23	12.6	2.9	9.7
42410	12	DD	26/ 92	12	-11.2	4.9	17.8
48565	00	DD	8/ 98	9	11.4	9.5	18.7
62337	00	DD	31/ 34	23	-12.8	7.9	10.3

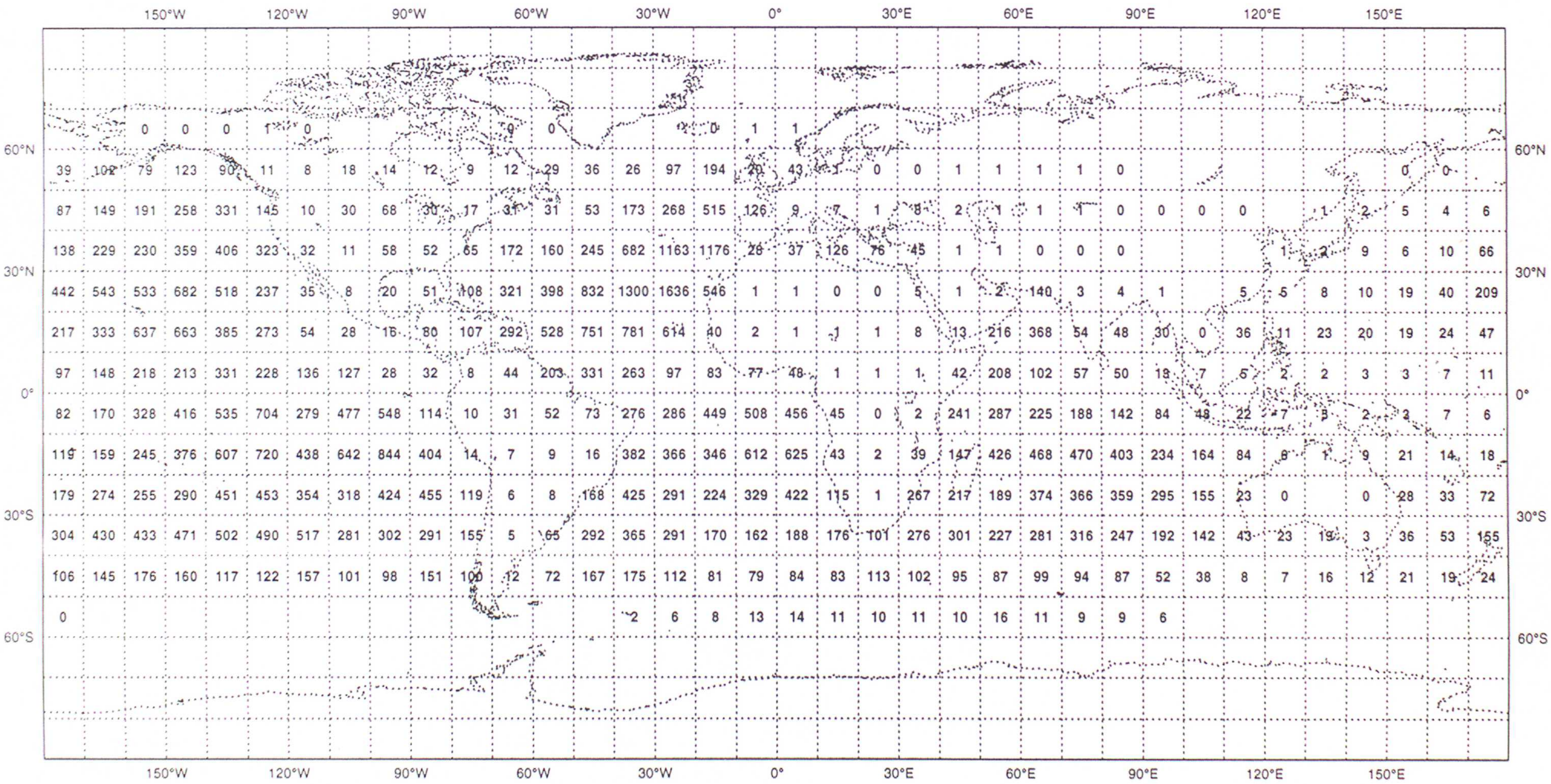
MONITORING OF SATELLITE WINDS

MONITORING CENTRE: BRACKNELL

MONTH: May 2003

Monitoring procedures	
Period	:One calendar month.
Data monitored	:Reports from GOES-8, GOES-10, METEOSAT-5, METEOSAT-7, GMS-5, INSAT.
Standard of comparison	:Background field from UKMO global model.
Selection Criteria	:number of observations > 10.
Data Extracted	:Layer 701 - 1000 hPa 401 - 700 hPa 101 - 400 hPa
	:Mean wind
	:Mean observation minus background vector wind differences
	:Mean observation minus background speed differences
	:RMS of observation minus background vector differences

Figure 10. SATOB 701 - 1000 hPa mean daily count. MAY 2003
Global average number of observations in 24 hours = 64192



		0	0	0	1	0					0	0				0	1	1																	
39	102	79	123	90	11	8	18	14	12	9	12	29	36	26	97	194	20	43	1	0	0	1	1	1	1	0							0	0	
87	149	191	258	331	145	10	30	68	30	17	31	31	53	173	268	515	126	9	7	1	8	2	1	1	1	0	0	0	0		1	2	5	4	6
138	229	230	359	406	323	32	11	58	52	65	172	160	245	682	1163	1176	28	37	126	76	45	1	1	0	0	0				1	2	9	6	10	66
442	543	533	682	518	237	35	8	20	51	108	321	398	832	1300	1636	546	1	1	0	0	5	1	2	140	3	4	1		5	5	8	10	19	40	209
217	333	637	663	385	273	54	28	16	80	107	292	528	751	781	614	40	2	1	1	1	8	13	216	368	54	48	30	0	36	11	23	20	19	24	47
97	148	218	213	331	228	136	127	28	32	8	44	203	331	263	97	83	77	48	1	1	1	42	208	102	57	50	18	7	5	2	2	3	3	7	11
82	170	328	416	535	704	279	477	548	114	10	31	52	73	276	286	449	508	456	45	0	2	241	287	225	188	142	84	48	22	7	3	2	3	7	6
119	159	245	376	607	720	438	642	844	404	14	7	9	16	382	366	346	612	625	43	2	39	147	426	468	470	403	234	164	84	8	1	9	21	14	18
179	274	255	290	451	453	354	318	424	455	119	6	8	168	425	291	224	329	422	115	1	267	217	189	374	366	359	295	155	23	0		0	28	33	72
304	430	433	471	502	490	517	281	302	291	155	5	65	292	365	291	170	162	188	176	101	276	301	227	281	316	247	192	142	43	23	19	3	36	53	155
106	145	176	160	117	122	157	101	98	151	100	12	72	167	175	112	81	79	84	83	113	102	95	87	99	94	87	52	38	8	7	16	12	21	19	24
0														2	6	8	13	14	11	10	11	10	16	11	9	9	6								

Figure 11. SATOB 701 - 1000 hPa vector mean wind. MAY 2003
All observations
Arrows are plotted where greater than 10 obs are present

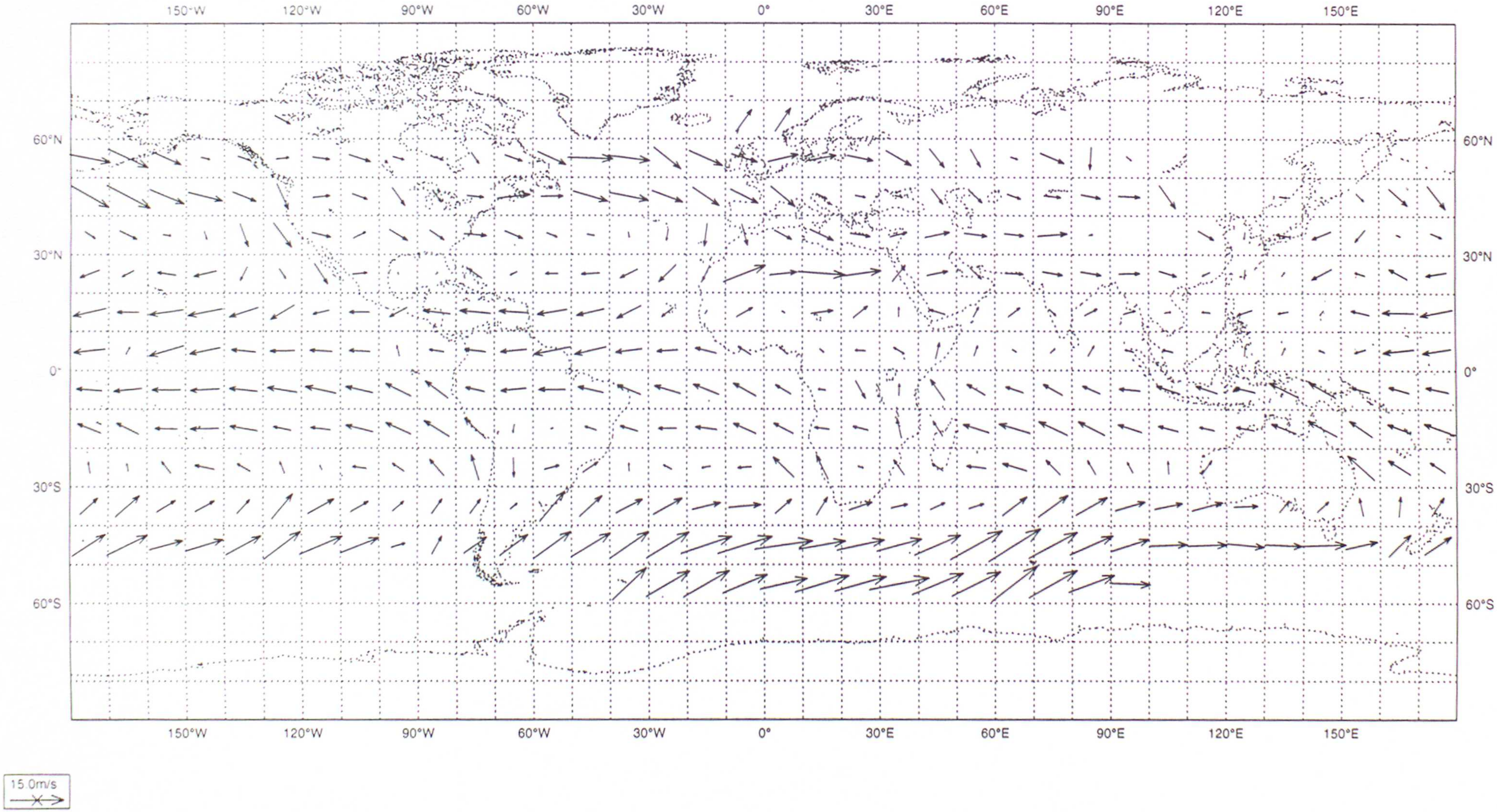

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0m/s

Figure 12. SATOB 701 - 1000 hPa mean vector wind differences. MAY 2003
All observations
Arrows are plotted where greater than 10 obs are present

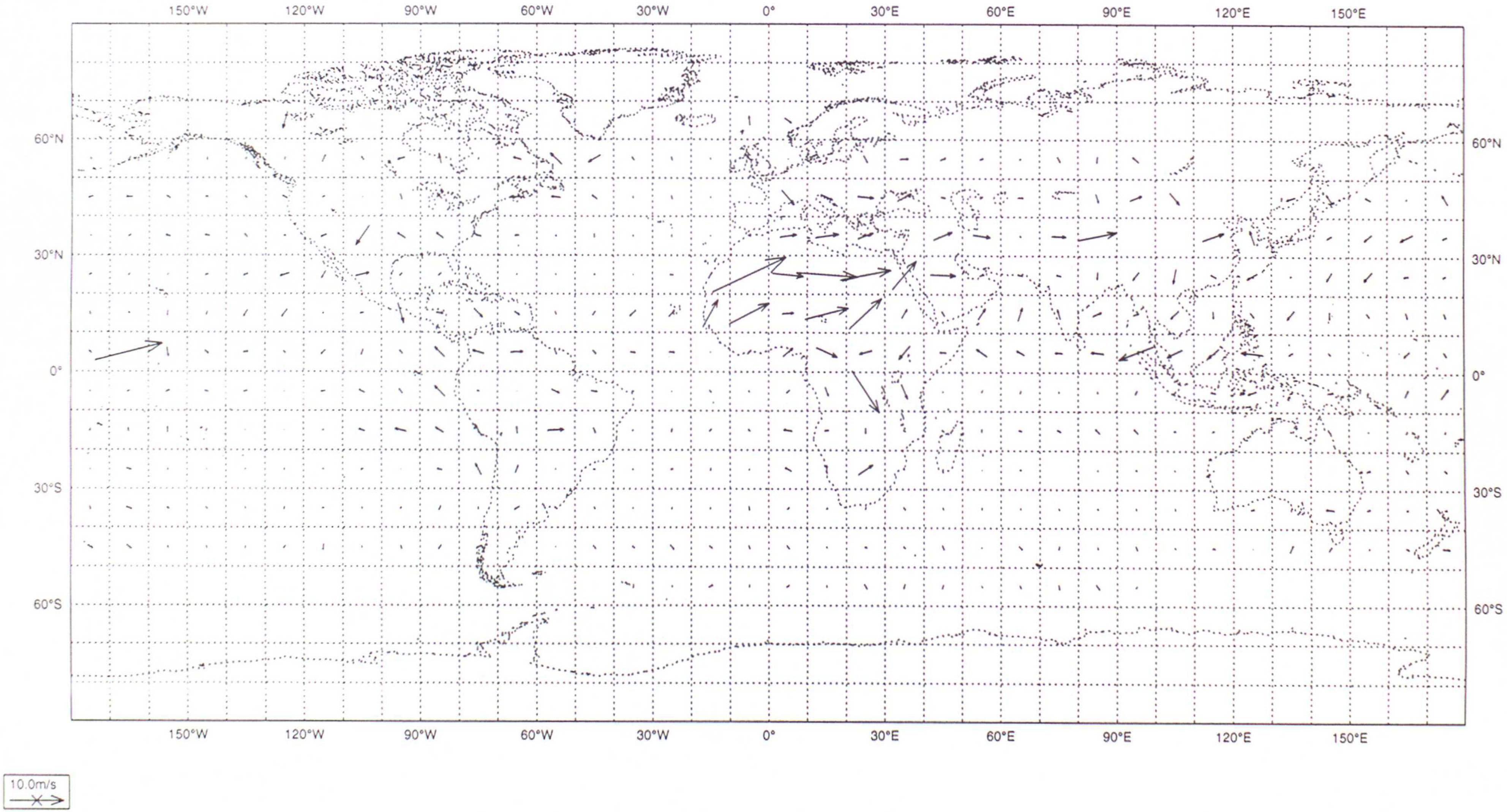

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
10.0m/s

Figure 13. SATOB 701 - 1000 hPa mean O-B speed differences (ms-1). MAY 2003
All observations
Values are plotted where greater than 10 obs are present

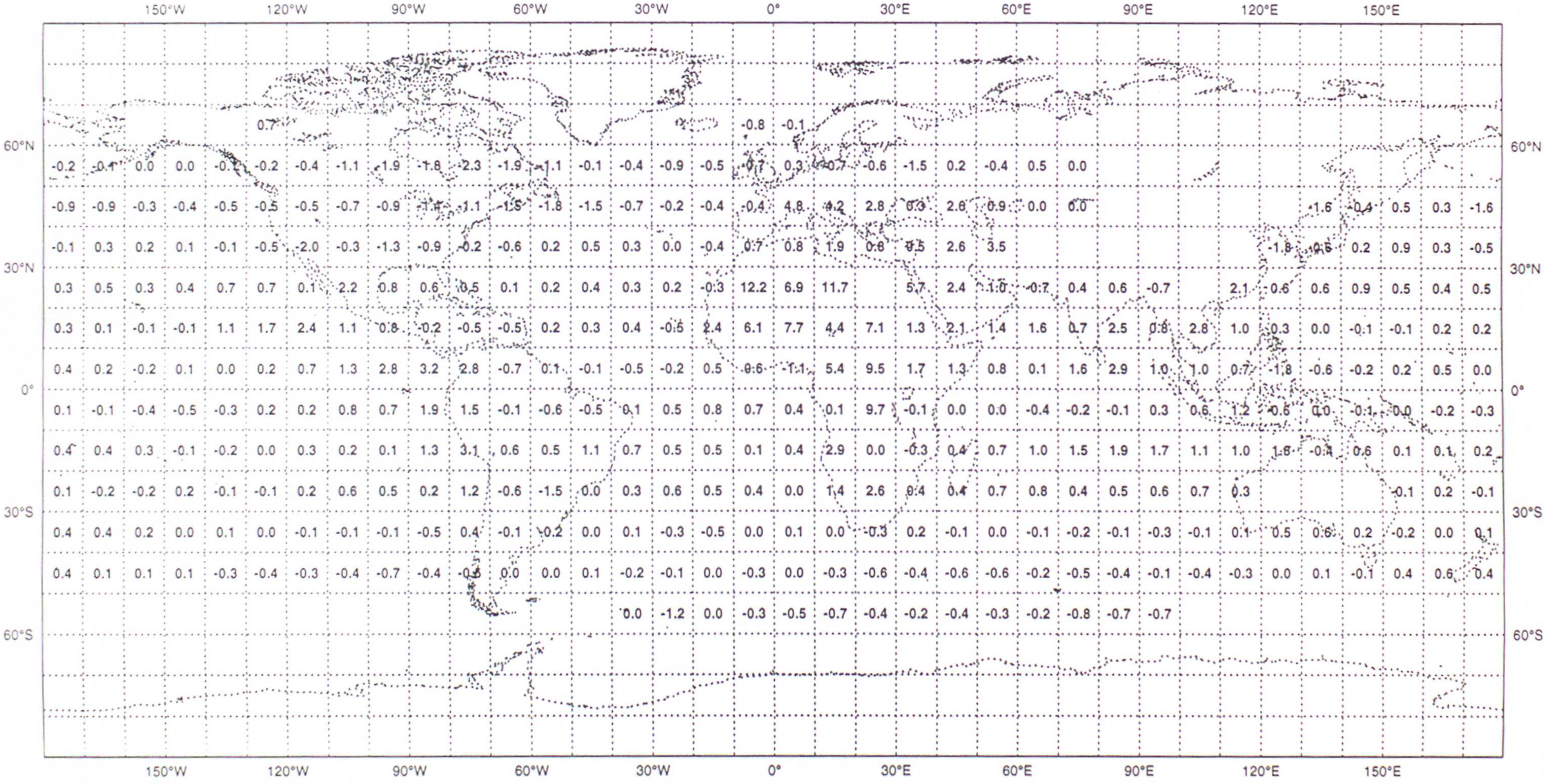

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
0.7 -0.8 -0.1
-0.2 -0.1 0.0 0.0 -0.1 -0.2 -0.4 -1.1 -1.9 -1.8 -2.3 -1.9 -1.1 -0.1 -0.4 -0.9 -0.5 -0.7 0.3 -0.7 -0.6 -1.5 0.2 -0.4 0.5 0.0
-0.9 -0.9 -0.3 -0.4 -0.5 -0.5 -0.5 -0.7 -0.9 -1.4 -1.1 -1.5 -1.8 -1.5 -0.7 -0.2 -0.4 -0.4 4.8 4.2 2.8 0.3 2.6 0.9 0.0 0.0 -1.6 -0.4 0.5 0.3 -1.6
-0.1 0.3 0.2 0.1 -0.1 -0.5 -2.0 -0.3 -1.3 -0.9 -0.2 -0.6 0.2 0.5 0.3 0.0 -0.4 0.7 0.8 1.9 0.6 0.5 2.6 3.5 -1.8 -0.5 0.2 0.9 0.3 -0.5
0.3 0.5 0.3 0.4 0.7 0.7 0.1 2.2 0.8 0.6 0.5 0.1 0.2 0.4 0.3 0.2 -0.3 12.2 6.9 11.7 5.7 2.4 1.0 -0.7 0.4 0.6 -0.7 2.1 0.6 0.6 0.9 0.5 0.4 0.5
0.3 0.1 -0.1 -0.1 1.1 1.7 2.4 1.1 0.8 -0.2 -0.5 -0.5 0.2 0.3 0.4 -0.5 2.4 6.1 7.7 4.4 7.1 1.3 2.1 1.4 1.6 0.7 2.5 0.8 2.8 1.0 0.3 0.0 -0.1 -0.1 0.2 0.2
0.4 0.2 -0.2 0.1 0.0 0.2 0.7 1.3 2.8 3.2 2.8 -0.7 0.1 -0.1 -0.5 -0.2 0.5 0.6 -1.1 5.4 9.5 1.7 1.3 0.8 0.1 1.6 2.9 1.0 1.0 0.7 -1.8 -0.6 -0.2 0.2 0.5 0.0
0.1 -0.1 -0.4 -0.5 -0.3 0.2 0.2 0.8 0.7 1.9 1.5 -0.1 -0.6 -0.5 0.1 0.5 0.8 0.7 0.4 0.1 9.7 -0.1 0.0 0.0 -0.4 -0.2 -0.1 0.3 0.6 1.2 -0.6 0.0 -0.1 0.0 -0.2 -0.3
0.4 0.4 0.3 -0.1 -0.2 0.0 0.3 0.2 0.1 1.3 3.1 0.6 0.5 1.1 0.7 0.5 0.5 0.1 0.4 2.9 0.0 -0.3 0.4 0.7 1.0 1.5 1.9 1.7 1.1 1.0 1.6 -0.4 0.6 0.1 0.1 0.2
0.1 -0.2 -0.2 0.2 -0.1 -0.1 0.2 0.6 0.5 0.2 1.2 -0.6 -1.5 0.0 0.3 0.6 0.5 0.4 0.0 1.4 2.6 0.4 0.4 0.7 0.8 0.4 0.5 0.6 0.7 0.3 -0.1 0.2 -0.1
0.4 0.4 0.2 0.0 0.1 0.0 -0.1 -0.1 -0.1 -0.5 0.4 -0.1 -0.2 0.0 0.1 -0.3 -0.5 0.0 0.1 0.0 -0.3 0.2 -0.1 0.0 -0.1 -0.2 -0.1 -0.3 -0.1 0.1 0.5 0.6 0.2 -0.2 0.0 0.1
0.4 0.1 0.1 0.1 -0.3 -0.4 -0.3 -0.4 -0.7 -0.4 -0.5 0.0 0.0 0.1 -0.2 -0.1 0.0 -0.3 0.0 -0.3 -0.6 -0.4 -0.6 -0.6 -0.2 -0.5 -0.4 -0.1 -0.4 -0.3 0.0 0.1 -0.1 0.4 0.6 0.4
0.0 -1.2 0.0 -0.3 -0.5 -0.7 -0.4 -0.2 -0.4 -0.3 -0.2 -0.8 -0.7 -0.7

Figure 14. SATOB 701 - 1000 hPa mean RMS O-B vector differences (ms-1). MAY 2003
All observations
Values are plotted where greater than 10 obs are present

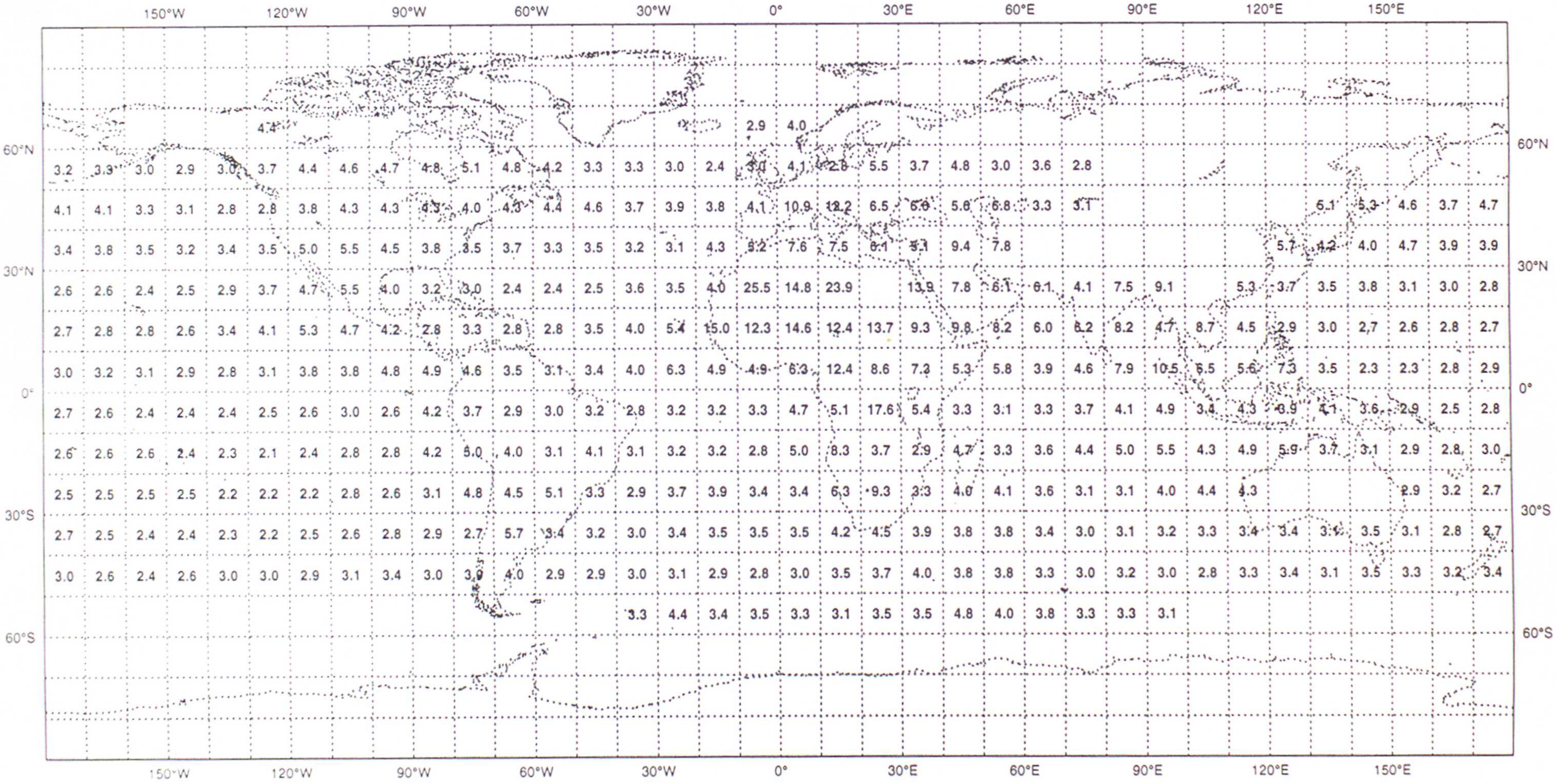

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
4.4 2.9 4.0
3.2 3.3 3.0 2.9 3.0 3.7 4.4 4.6 4.7 4.8 5.1 4.8 4.2 3.3 3.3 3.0 2.4 3.0 4.1 2.8 5.5 3.7 4.8 3.0 3.6 2.8
4.1 4.1 3.3 3.1 2.8 2.8 3.8 4.3 4.3 4.3 4.0 4.3 4.4 4.6 3.7 3.9 3.8 4.1 10.9 12.2 6.5 6.0 5.6 6.8 3.3 3.1 5.1 5.3 4.6 3.7 4.7
3.4 3.8 3.5 3.2 3.4 3.5 5.0 5.5 4.5 3.8 3.5 3.7 3.3 3.5 3.2 3.1 4.3 5.2 7.6 7.5 6.1 5.1 9.4 7.8 5.7 4.2 4.0 4.7 3.9 3.9
2.6 2.6 2.4 2.5 2.9 3.7 4.7 5.5 4.0 3.2 3.0 2.4 2.4 2.5 3.6 3.5 4.0 25.5 14.8 23.9 13.9 7.8 6.1 6.1 4.1 7.5 9.1 5.3 3.7 3.5 3.8 3.1 3.0 2.8
2.7 2.8 2.8 2.6 3.4 4.1 5.3 4.7 4.2 2.8 3.3 2.8 2.8 3.5 4.0 5.4 15.0 12.3 14.6 12.4 13.7 9.3 9.8 8.2 6.0 8.2 8.2 4.7 8.7 4.5 2.9 3.0 2.7 2.6 2.8 2.7
3.0 3.2 3.1 2.9 2.8 3.1 3.8 3.8 4.8 4.9 4.6 3.5 3.1 3.4 4.0 6.3 4.9 4.9 6.3 12.4 8.6 7.3 5.3 5.8 3.9 4.6 7.9 10.5 6.5 5.6 7.3 3.5 2.3 2.3 2.8 2.9
2.7 2.6 2.4 2.4 2.4 2.5 2.6 3.0 2.6 4.2 3.7 2.9 3.0 3.2 2.8 3.2 3.2 3.3 4.7 5.1 17.6 5.4 3.3 3.1 3.3 3.7 4.1 4.9 3.4 4.3 3.9 4.1 3.6 2.9 2.5 2.8
2.6 2.6 2.6 2.4 2.3 2.1 2.4 2.8 2.8 4.2 5.0 4.0 3.1 4.1 3.1 3.2 3.2 2.8 5.0 8.3 3.7 2.9 4.7 3.3 3.6 4.4 5.0 5.5 4.3 4.9 5.9 3.7 3.1 2.9 2.8 3.0
2.5 2.5 2.5 2.5 2.2 2.2 2.2 2.8 2.6 3.1 4.8 4.5 5.1 3.3 2.9 3.7 3.9 3.4 3.4 6.3 9.3 3.3 4.0 4.1 3.6 3.1 3.1 4.0 4.4 4.3 2.9 3.2 2.7
2.7 2.5 2.4 2.4 2.3 2.2 2.5 2.6 2.8 2.9 2.7 5.7 3.4 3.2 3.0 3.4 3.5 3.5 3.5 4.2 4.5 3.9 3.8 3.8 3.4 3.0 3.1 3.2 3.3 3.4 3.4 3.1 3.5 3.1 2.8 2.7
3.0 2.6 2.4 2.6 3.0 3.0 2.9 3.1 3.4 3.0 3.0 4.0 2.9 2.9 3.0 3.1 2.9 2.8 3.0 3.5 3.7 4.0 3.8 3.8 3.3 3.0 3.2 3.0 2.8 3.3 3.4 3.1 3.5 3.3 3.2 3.4
3.3 4.4 3.4 3.5 3.3 3.1 3.5 3.5 4.8 4.0 3.8 3.3 3.3 3.1

Figure 15. SATOB 401 - 700 hPa mean daily count. MAY 2003
Global average number of observations in 24 hours = 13822

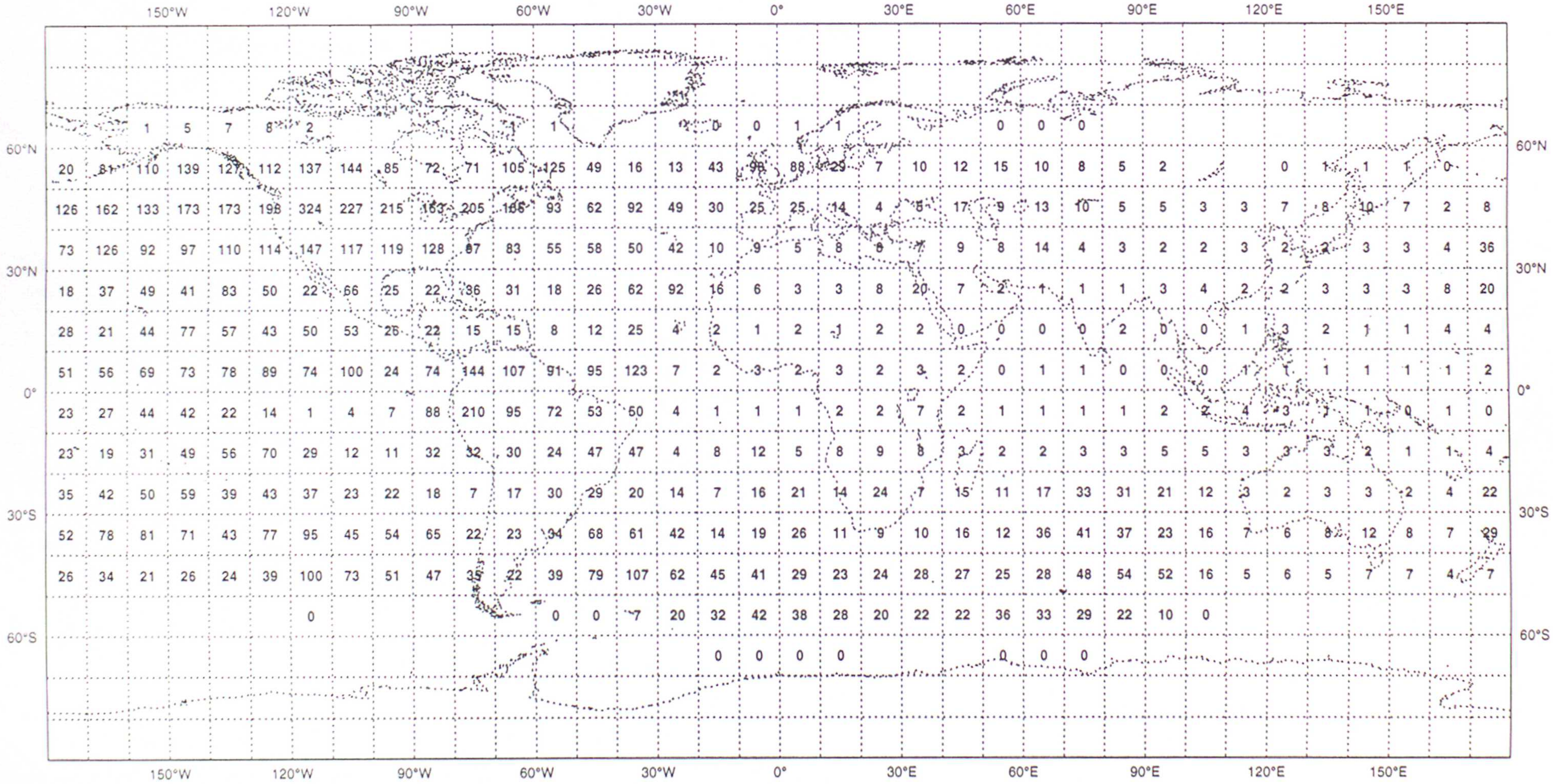

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
1 5 7 8 2 1 1 0 0 1 1 0 0 0
20 81 110 139 127 112 137 144 85 72 71 105 125 49 16 13 43 98 88 29 7 10 12 15 10 8 5 2 0 1 1 1 0
126 162 133 173 173 198 324 227 215 163 205 166 93 62 92 49 30 25 25 14 4 6 17 9 13 10 5 5 3 3 7 8 10 7 2 8
73 126 92 97 110 114 147 117 119 128 87 83 55 58 50 42 10 9 5 8 8 7 9 8 14 4 3 2 2 3 2 2 3 3 4 36
18 37 49 41 83 50 22 66 25 22 36 31 18 26 62 92 16 6 3 3 8 20 7 2 1 1 1 3 4 2 2 3 3 3 8 20
28 21 44 77 57 43 50 53 26 22 15 15 8 12 25 4 2 1 2 1 2 2 0 0 0 0 2 0 0 1 3 2 1 1 4 4
51 56 69 73 78 89 74 100 24 74 144 107 91 95 123 7 2 3 2 3 2 3 2 0 1 1 0 0 0 1 1 1 1 1 1 2
23 27 44 42 22 14 1 4 7 88 210 95 72 53 50 4 1 1 1 2 2 7 2 1 1 1 1 2 2 4 3 1 1 0 1 0
23 19 31 49 56 70 29 12 11 32 32 30 24 47 47 4 8 12 5 8 9 8 3 2 2 3 3 5 5 3 3 3 2 1 1 4
35 42 50 59 39 43 37 23 22 18 7 17 30 29 20 14 7 16 21 14 24 7 15 11 17 33 31 21 12 3 2 3 3 2 4 22
52 78 81 71 43 77 95 45 54 65 22 23 34 68 61 42 14 19 26 11 9 10 16 12 36 41 37 23 16 7 6 8 12 8 7 29
26 34 21 26 24 39 100 73 51 47 35 22 39 79 107 62 45 41 29 23 24 28 27 25 28 48 54 52 16 5 6 5 7 7 4 7
0 0 0 7 20 32 42 38 28 20 22 22 36 33 29 22 10 0
0 0 0 0 0 0 0

Figure 16. SATOB 401 - 700 hPa vector mean wind. MAY 2003
All observations
Arrows are plotted where greater than 10 obs are present

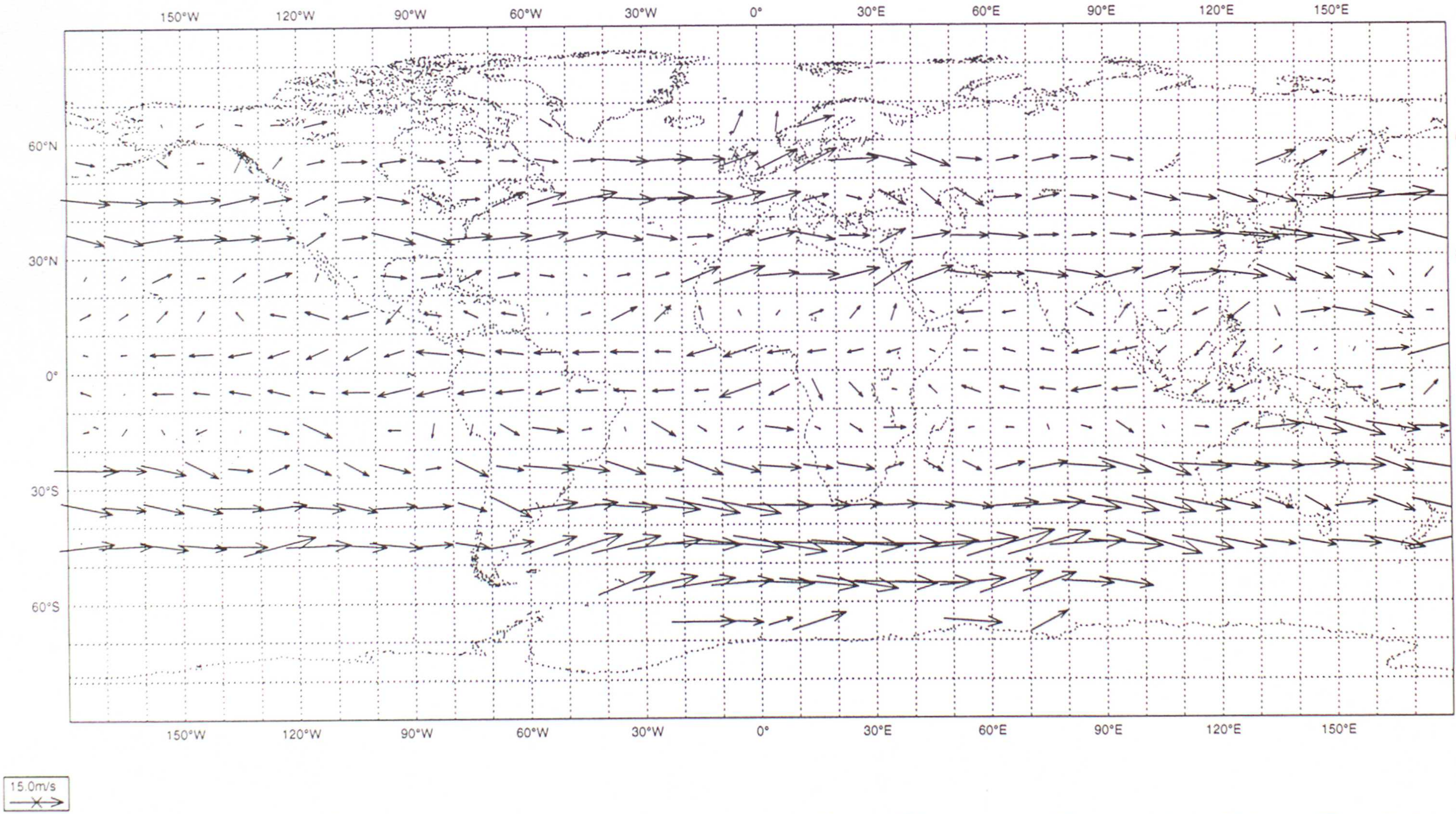

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0m/s

Figure 17. SATOB 401 - 700 hPa mean vector wind differences. MAY 2003
All observations
Arrows are plotted where greater than 10 obs are present

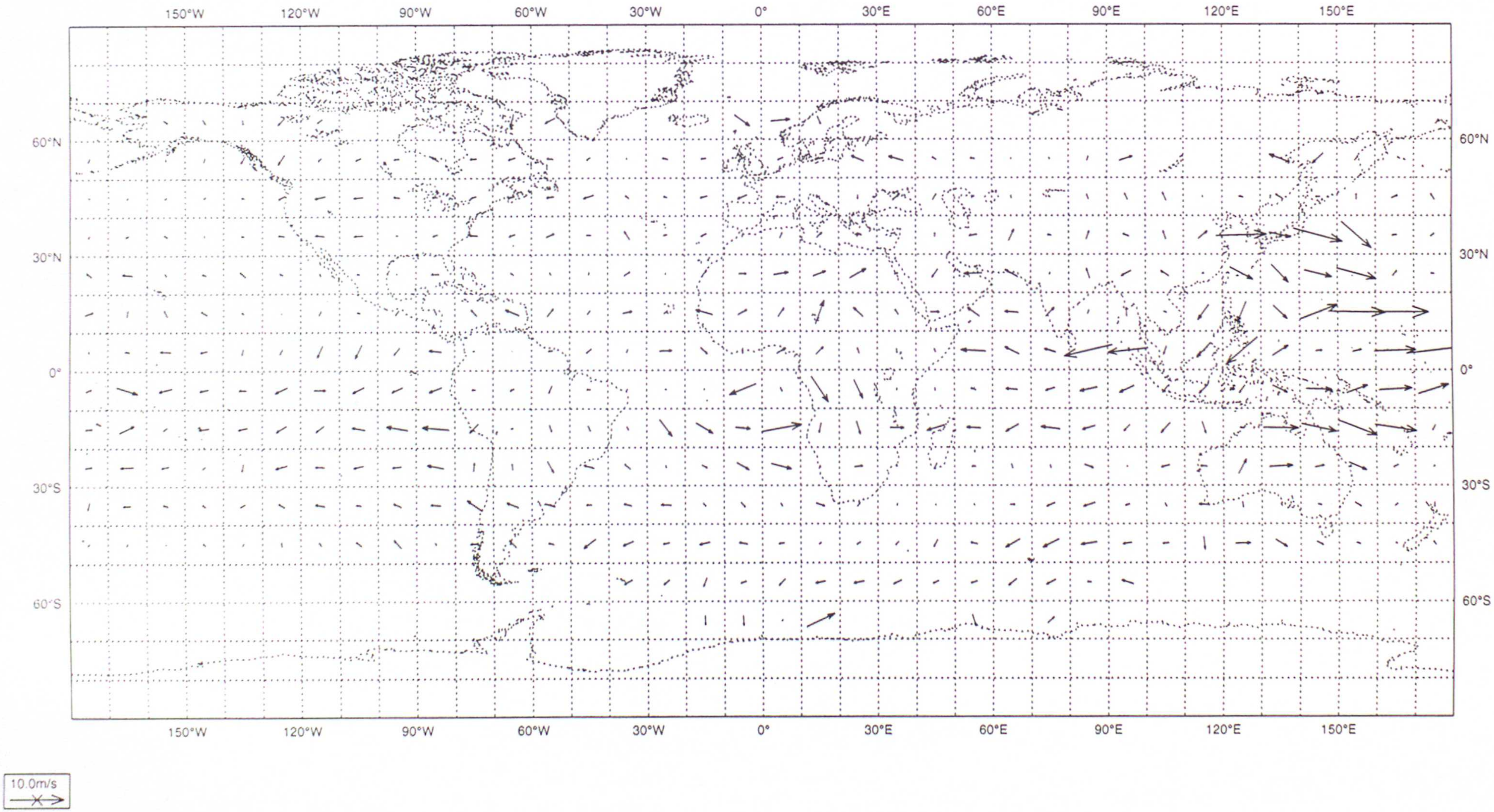

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
10.0m/s

Figure 18. SATOB 401 - 700 hPa mean O-B speed differences (ms-1). MAY 2003
All observations
Values are plotted where greater than 10 obs are present

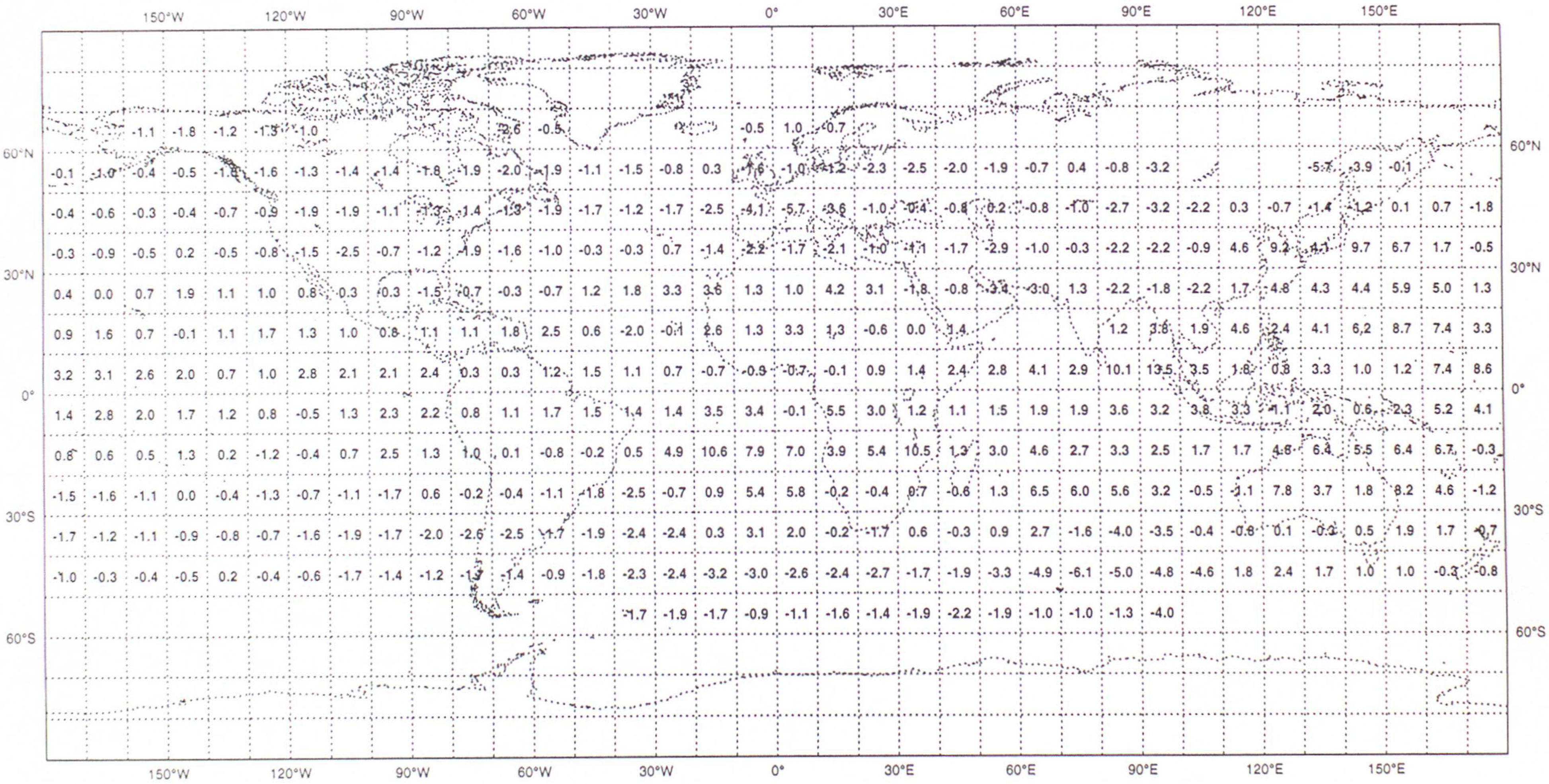

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
-1.1 -1.8 -1.2 -1.3 -1.0 2.6 -0.5 -0.5 1.0 -0.7
-0.1 -1.0 -0.4 -0.5 -1.8 -1.6 -1.3 -1.4 -1.4 -1.8 -1.9 -2.0 -1.9 -1.1 -1.5 -0.8 0.3 -1.6 -1.0 -1.2 -2.3 -2.5 -2.0 -1.9 -0.7 0.4 -0.8 -3.2 -5.7 -3.9 -0.1
-0.4 -0.6 -0.3 -0.4 -0.7 -0.9 -1.9 -1.9 -1.1 -1.3 -1.4 -1.3 -1.9 -1.7 -1.2 -1.7 -2.5 -4.1 -5.7 -3.6 -1.0 -0.4 -0.8 0.2 -0.8 -1.0 -2.7 -3.2 -2.2 0.3 -0.7 -1.4 -1.2 0.1 0.7 -1.8
-0.3 -0.9 -0.5 0.2 -0.5 -0.8 -1.5 -2.5 -0.7 -1.2 -1.9 -1.6 -1.0 -0.3 -0.3 0.7 -1.4 -2.2 -1.7 -2.1 -1.0 -1.1 -1.7 -2.9 -1.0 -0.3 -2.2 -2.2 -0.9 4.6 9.2 4.1 9.7 6.7 1.7 -0.5
0.4 0.0 0.7 1.9 1.1 1.0 0.8 -0.3 0.3 -1.5 -0.7 -0.3 -0.7 1.2 1.8 3.3 3.6 1.3 1.0 4.2 3.1 -1.8 -0.8 -3.4 -3.0 1.3 -2.2 -1.8 -2.2 1.7 -4.8 4.3 4.4 5.9 5.0 1.3
0.9 1.6 0.7 -0.1 1.1 1.7 1.3 1.0 0.8 1.1 1.1 1.8 2.5 0.6 -2.0 -0.1 2.6 1.3 3.3 1.3 -0.6 0.0 1.4 1.2 3.8 1.9 4.6 2.4 4.1 6.2 8.7 7.4 3.3
3.2 3.1 2.6 2.0 0.7 1.0 2.8 2.1 2.1 2.4 0.3 0.3 1.2 1.5 1.1 0.7 -0.7 -0.9 -0.7 -0.1 0.9 1.4 2.4 2.8 4.1 2.9 10.1 13.5 3.5 1.8 0.8 3.3 1.0 1.2 7.4 8.6
1.4 2.8 2.0 1.7 1.2 0.8 -0.5 1.3 2.3 2.2 0.8 1.1 1.7 1.5 1.4 1.4 3.5 3.4 -0.1 5.5 3.0 1.2 1.1 1.5 1.9 1.9 3.6 3.2 3.8 3.3 -1.1 2.0 0.6 2.3 5.2 4.1
0.8 0.6 0.5 1.3 0.2 -1.2 -0.4 0.7 2.5 1.3 1.0 0.1 -0.8 -0.2 0.5 4.9 10.6 7.9 7.0 3.9 5.4 10.5 1.3 3.0 4.6 2.7 3.3 2.5 1.7 1.7 4.8 6.4 5.5 6.4 6.7 -0.3
-1.5 -1.6 -1.1 0.0 -0.4 -1.3 -0.7 -1.1 -1.7 0.6 -0.2 -0.4 -1.1 -1.8 -2.5 -0.7 0.9 5.4 5.8 -0.2 -0.4 0.7 -0.6 1.3 6.5 6.0 5.6 3.2 -0.5 -1.1 7.8 3.7 1.8 8.2 4.6 -1.2
-1.7 -1.2 -1.1 -0.9 -0.8 -0.7 -1.6 -1.9 -1.7 -2.0 -2.6 -2.5 -1.7 -1.9 -2.4 -2.4 0.3 3.1 2.0 -0.2 -1.7 0.6 -0.3 0.9 2.7 -1.6 -4.0 -3.5 -0.4 -0.8 0.1 -0.3 0.5 1.9 1.7 -0.7
-1.0 -0.3 -0.4 -0.5 0.2 -0.4 -0.6 -1.7 -1.4 -1.2 -1.3 -1.4 -0.9 -1.8 -2.3 -2.4 -3.2 -3.0 -2.6 -2.4 -2.7 -1.7 -1.9 -3.3 -4.9 -6.1 -5.0 -4.8 -4.6 1.8 2.4 1.7 1.0 1.0 -0.3 -0.8
-1.7 -1.9 -1.7 -0.9 -1.1 -1.6 -1.4 -1.9 -2.2 -1.9 -1.0 -1.0 -1.3 -4.0

Figure 19. SATOB 401 - 700 hPa mean RMS O-B vector differences (ms-1). MAY 2003
All observations
Values are plotted where greater than 10 obs are present

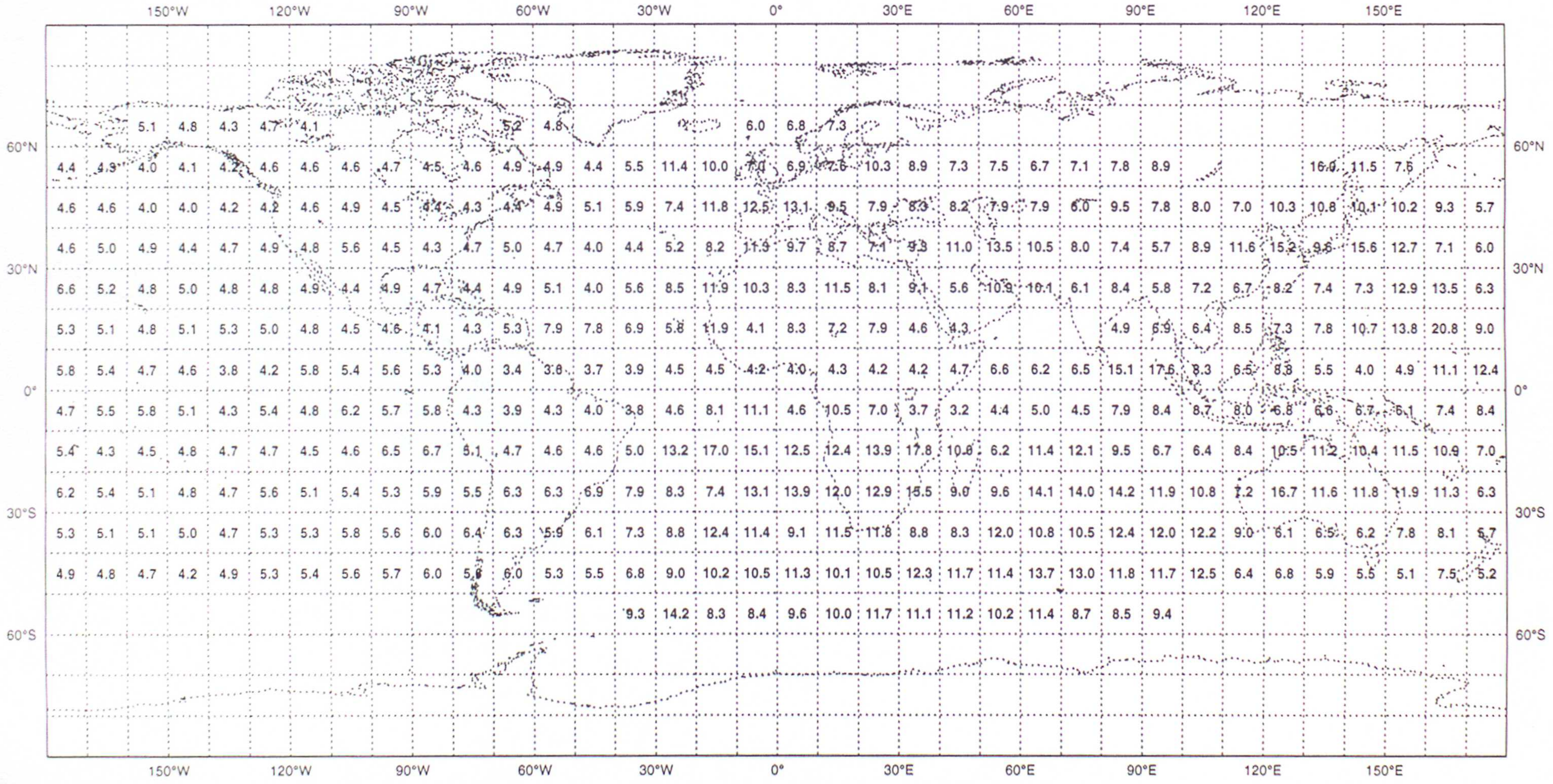
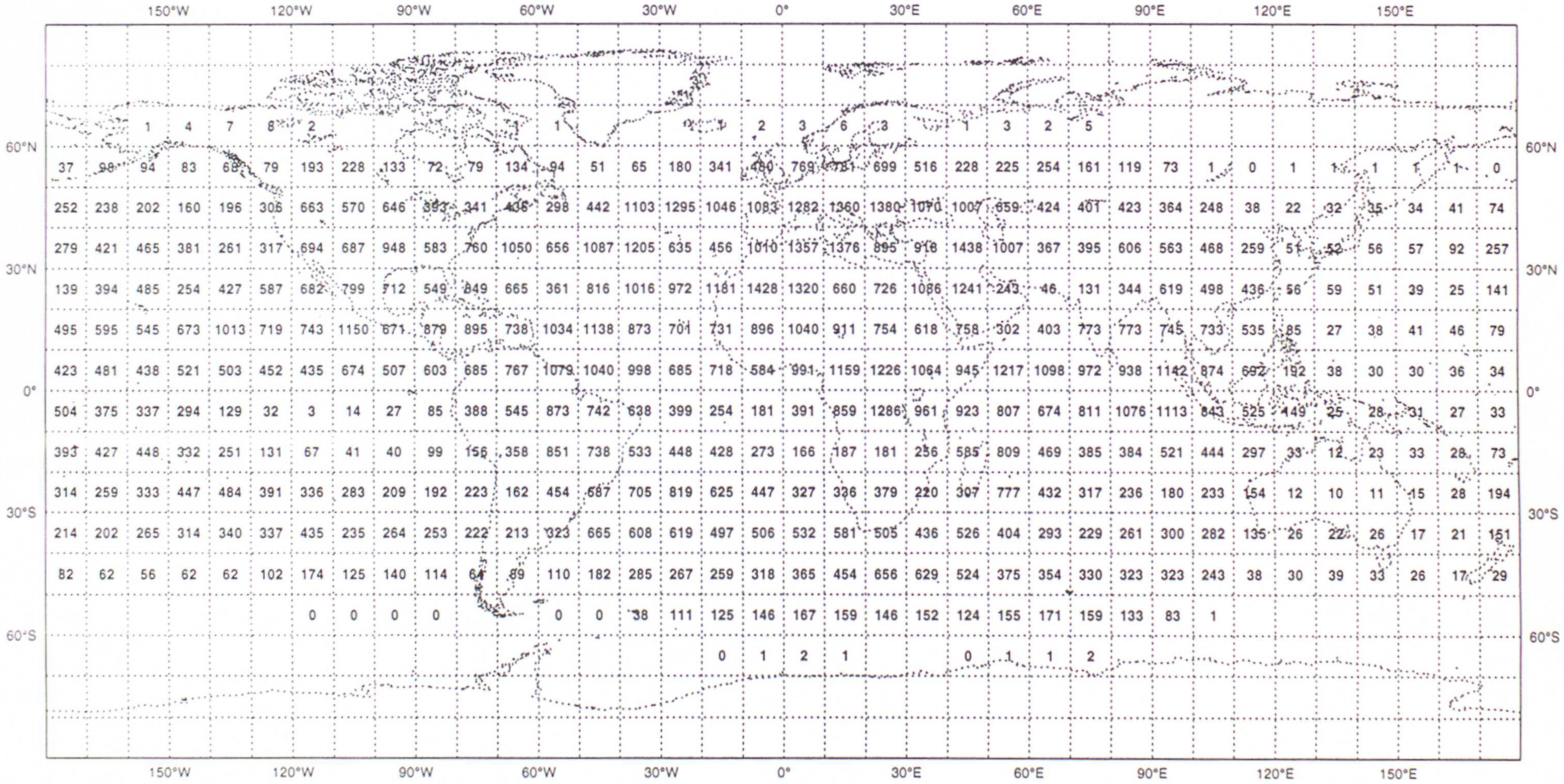

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
5.1 4.8 4.3 4.7 4.1 5.2 4.8 6.0 6.8 7.3
4.4 4.9 4.0 4.1 4.2 4.6 4.6 4.6 4.7 4.5 4.6 4.9 4.9 4.4 5.5 11.4 10.0 7.0 6.9 7.6 10.3 8.9 7.3 7.5 6.7 7.1 7.8 8.9 16.0 11.5 7.5
4.6 4.6 4.0 4.0 4.2 4.2 4.6 4.9 4.5 4.4 4.3 4.4 4.9 5.1 5.9 7.4 11.8 12.5 13.1 9.5 7.9 8.3 8.2 7.9 7.9 6.0 9.5 7.8 8.0 7.0 10.3 10.8 10.1 10.2 9.3 5.7
4.6 5.0 4.9 4.4 4.7 4.9 4.8 5.6 4.5 4.3 4.7 5.0 4.7 4.0 4.4 5.2 8.2 11.9 9.7 8.7 7.1 9.3 11.0 13.5 10.5 8.0 7.4 5.7 8.9 11.6 15.2 9.6 15.6 12.7 7.1 6.0
6.6 5.2 4.8 5.0 4.8 4.8 4.9 4.4 4.9 4.7 4.4 4.9 5.1 4.0 5.6 8.5 11.9 10.3 8.3 11.5 8.1 9.1 5.6 10.9 10.1 6.1 8.4 5.8 7.2 6.7 8.2 7.4 7.3 12.9 13.5 6.3
5.3 5.1 4.8 5.1 5.3 5.0 4.8 4.5 4.6 4.1 4.3 5.3 7.9 7.8 6.9 5.8 11.9 4.1 8.3 7.2 7.9 4.6 4.3 4.9 6.9 6.4 8.5 7.3 7.8 10.7 13.8 20.8 9.0
5.8 5.4 4.7 4.6 3.8 4.2 5.8 5.4 5.6 5.3 4.0 3.4 3.8 3.7 3.9 4.5 4.5 4.2 4.0 4.3 4.2 4.2 4.7 6.6 6.2 6.5 15.1 17.6 8.3 6.5 8.8 5.5 4.0 4.9 11.1 12.4
4.7 5.5 5.8 5.1 4.3 5.4 4.8 6.2 5.7 5.8 4.3 3.9 4.3 4.0 3.8 4.6 8.1 11.1 4.6 10.5 7.0 3.7 3.2 4.4 5.0 4.5 7.9 8.4 8.7 8.0 6.8 6.6 6.7 6.1 7.4 8.4
5.4 4.3 4.5 4.8 4.7 4.7 4.5 4.6 6.5 6.7 5.1 4.7 4.6 4.6 5.0 13.2 17.0 15.1 12.5 12.4 13.9 17.8 10.8 6.2 11.4 12.1 9.5 6.7 6.4 8.4 10.5 11.2 10.4 11.5 10.9 7.0
6.2 5.4 5.1 4.8 4.7 5.6 5.1 5.4 5.3 5.9 5.5 6.3 6.3 6.9 7.9 8.3 7.4 13.1 13.9 12.0 12.9 15.5 9.0 9.6 14.1 14.0 14.2 11.9 10.8 7.2 16.7 11.6 11.8 11.9 11.3 6.3
5.3 5.1 5.1 5.0 4.7 5.3 5.3 5.8 5.6 6.0 6.4 6.3 5.9 6.1 7.3 8.8 12.4 11.4 9.1 11.5 11.8 8.8 8.3 12.0 10.8 10.5 12.4 12.0 12.2 9.0 6.1 6.5 6.2 7.8 8.1 5.7
4.9 4.8 4.7 4.2 4.9 5.3 5.4 5.6 5.7 6.0 5.6 6.0 5.3 5.5 6.8 9.0 10.2 10.5 11.3 10.1 10.5 12.3 11.7 11.4 13.7 13.0 11.8 11.7 12.5 6.4 6.8 5.9 5.5 5.1 7.5 5.2
9.3 14.2 8.3 8.4 9.6 10.0 11.7 11.1 11.2 10.2 11.4 8.7 8.5 9.4

Figure 20. SATOB 101 - 400 hPa mean daily count. MAY 2003
Global average number of observations in 24 hours = 173819



		1	4	7	8	2					1	1				1	2	3	6	3		1	3	2	5										
37	98	94	83	68	79	193	228	133	72	79	134	94	51	65	180	341	480	769	781	699	516	228	225	254	161	119	73	1	0	1	1	1	1	1	0
252	238	202	160	196	306	663	570	646	393	341	436	298	442	1103	1295	1046	1083	1282	1360	1380	1070	1007	659	424	401	423	364	248	38	22	32	35	34	41	74
279	421	465	381	261	317	694	687	948	583	760	1050	656	1087	1205	635	456	1010	1357	1376	895	918	1438	1007	367	395	606	563	468	259	51	52	56	57	92	257
139	394	485	254	427	587	682	799	712	549	849	665	361	816	1016	972	1181	1428	1320	660	726	1086	1241	243	46	131	344	619	498	436	56	59	51	39	25	141
495	595	545	673	1013	719	743	1150	671	879	895	738	1034	1138	873	701	731	896	1040	911	754	618	758	302	403	773	773	745	733	535	85	27	38	41	46	79
423	481	438	521	503	452	435	674	507	603	685	767	1079	1040	998	685	718	584	991	1159	1226	1064	945	1217	1098	972	938	1142	874	692	192	38	30	30	36	34
504	375	337	294	129	32	3	14	27	85	388	545	873	742	638	399	254	181	391	859	1286	961	923	807	674	811	1076	1113	843	525	449	25	28	31	27	33
393	427	448	332	251	131	67	41	40	99	156	358	851	738	533	448	428	273	166	187	181	256	585	809	469	385	384	521	444	297	33	12	23	33	28	73
314	259	333	447	484	391	336	283	209	192	223	162	454	687	705	819	625	447	327	336	379	220	307	777	432	317	236	180	233	154	12	10	11	15	28	194
214	202	265	314	340	337	435	235	264	253	222	213	323	665	608	619	497	506	532	581	505	436	526	404	293	229	261	300	282	135	26	22	26	17	21	151
82	62	56	62	62	102	174	125	140	114	64	89	110	182	285	267	259	318	365	454	656	629	524	375	354	330	323	323	243	38	30	39	33	26	17	29
						0	0	0	0			0	0	38	111	125	146	167	159	146	152	124	155	171	159	133	83	1							
																0	1	2	1			0	1	1	2										

Figure 21. SATOB 101 - 400 hPa vector mean wind. MAY 2003
All observations
Arrows are plotted where greater than 10 obs are present

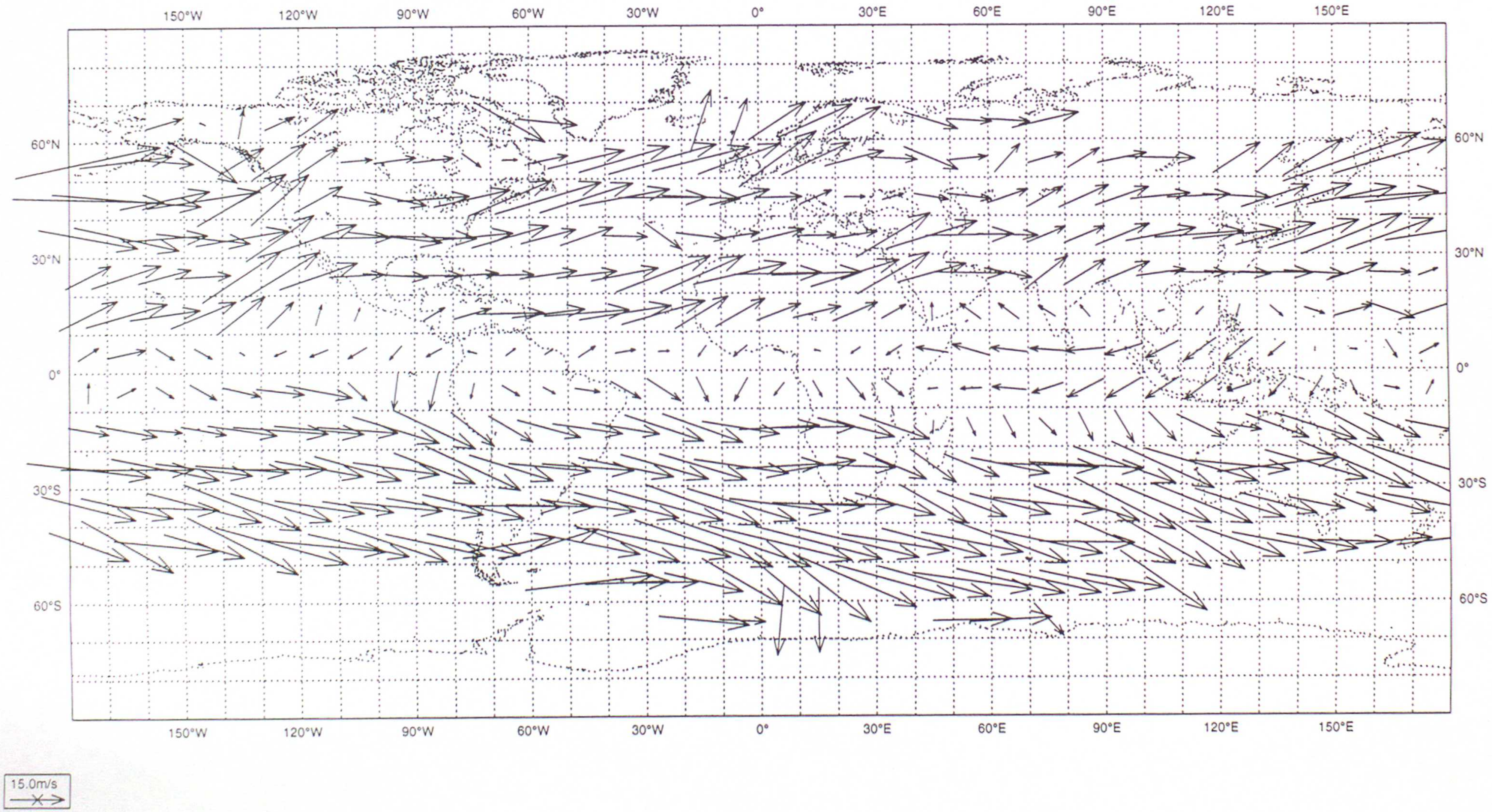

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0m/s

Figure 22. SATOB 101 - 400 hPa mean vector wind differences. MAY 2003
All observations
Arrows are plotted where greater than 10 obs are present

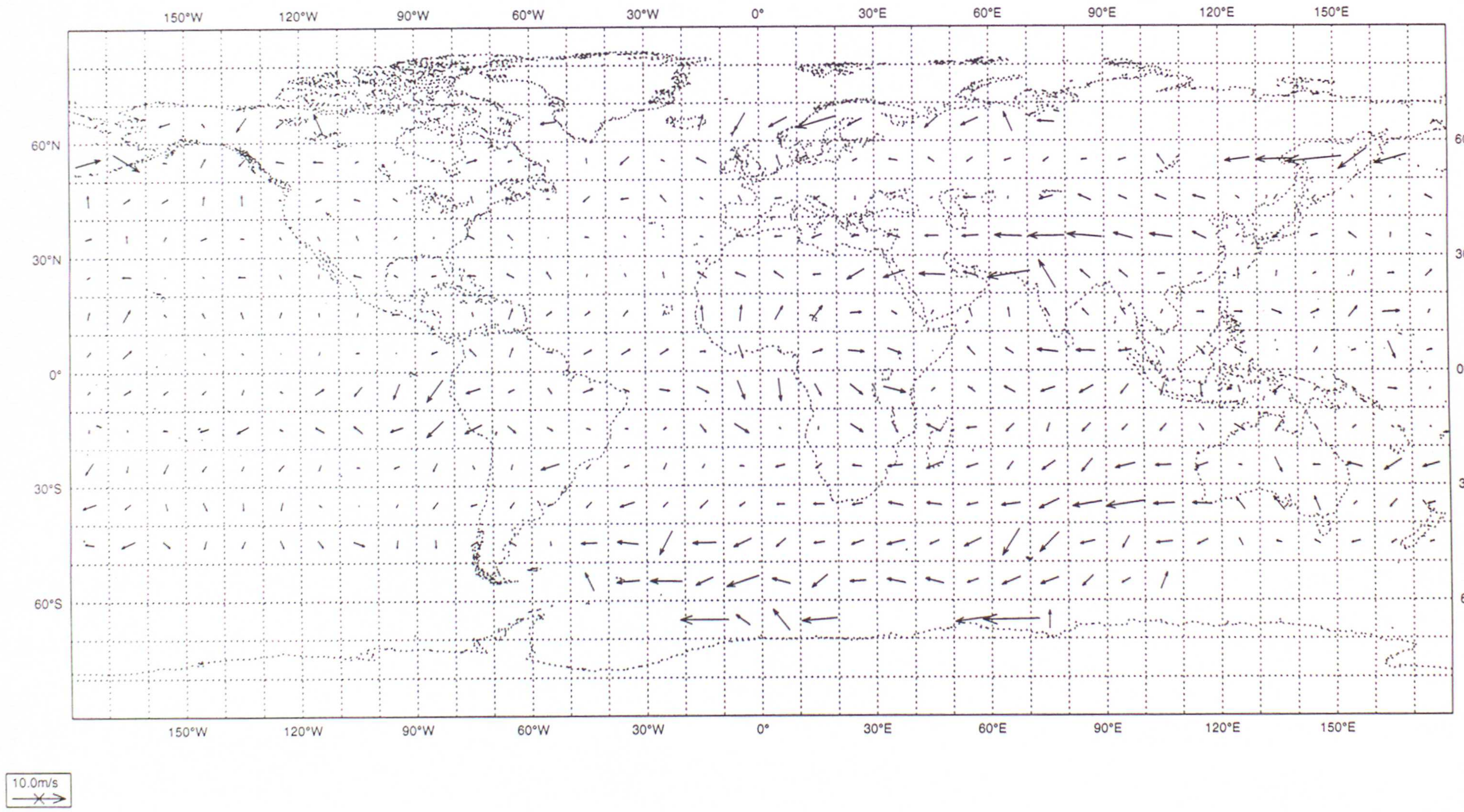

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
10.0m/s

Figure 23. SATOB 101 - 400 hPa mean O-B speed differences (ms-1). MAY 2003
All observations
Values are plotted where greater than 10 obs are present

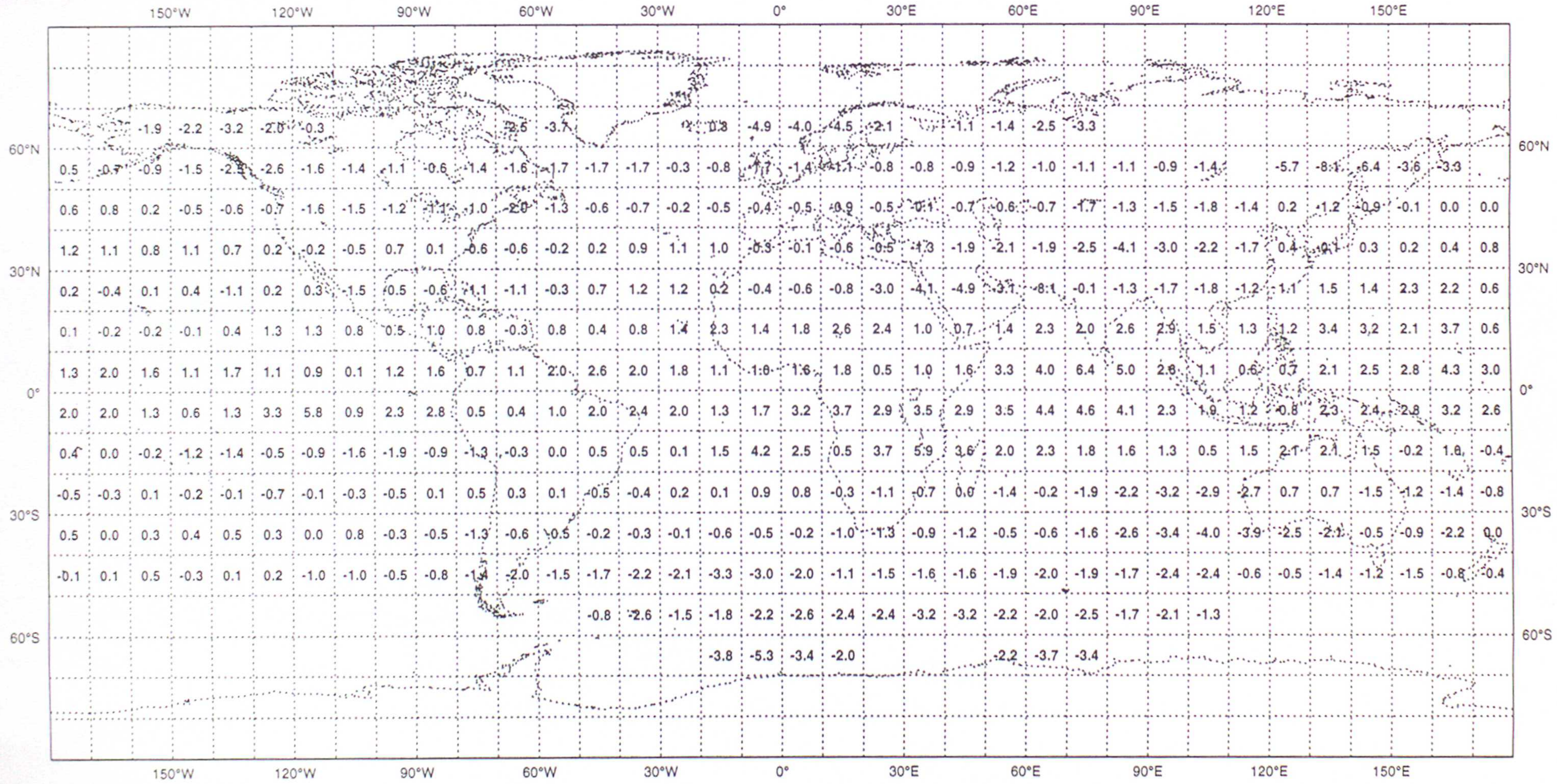
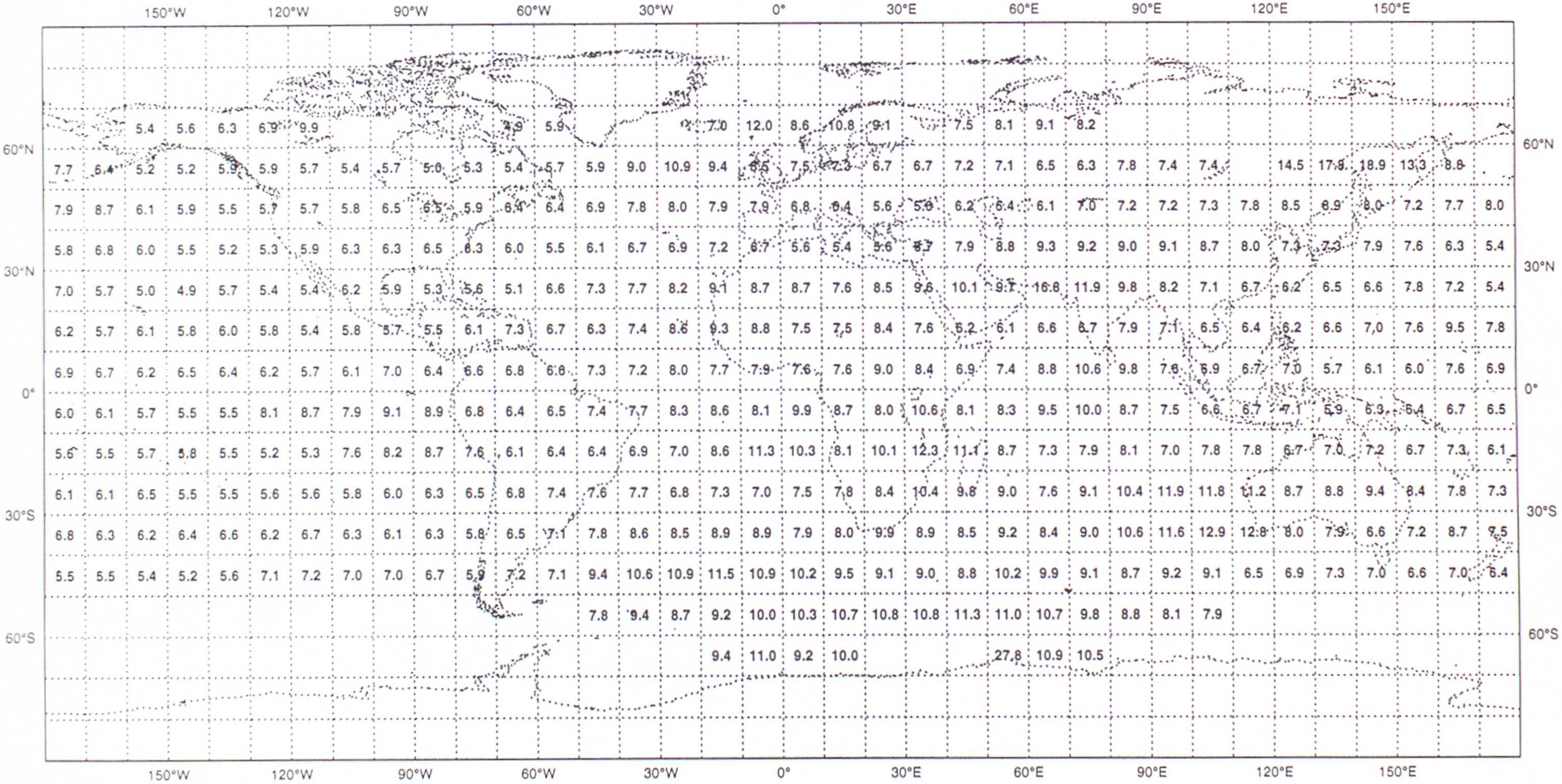

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
-1.9 -2.2 -3.2 -2.0 -0.3 -2.5 -3.7 0.3 -4.9 -4.0 -4.5 -2.1 -1.1 -1.4 -2.5 -3.3
0.5 -0.7 -0.9 -1.5 -2.1 -2.6 -1.6 -1.4 -1.1 -0.6 -1.4 -1.6 -1.7 -1.7 -1.7 -0.3 -0.8 -1.7 -1.4 -1.1 -0.8 -0.8 -0.9 -1.2 -1.0 -1.1 -1.1 -0.9 -1.4 -5.7 -8.1 -6.4 -3.6 -3.3
0.6 0.8 0.2 -0.5 -0.6 -0.7 -1.6 -1.5 -1.2 -1.1 -1.0 -2.0 -1.3 -0.6 -0.7 -0.2 -0.5 -0.4 -0.5 -0.9 -0.5 -0.1 -0.7 -0.6 -0.7 -1.7 -1.3 -1.5 -1.8 -1.4 0.2 -1.2 -0.9 -0.1 0.0 0.0
1.2 1.1 0.8 1.1 0.7 0.2 -0.2 -0.5 0.7 0.1 -0.6 -0.6 -0.2 0.2 0.9 1.1 1.0 -0.3 -0.1 -0.6 -0.5 -1.3 -1.9 -2.1 -1.9 -2.5 -4.1 -3.0 -2.2 -1.7 0.4 -0.1 0.3 0.2 0.4 0.8
0.2 -0.4 0.1 0.4 -1.1 0.2 0.3 -1.5 0.5 -0.6 -1.1 -1.1 -0.3 0.7 1.2 1.2 0.2 -0.4 -0.6 -0.8 -3.0 -4.1 -4.9 -3.1 -8.1 -0.1 -1.3 -1.7 -1.8 -1.2 -1.1 1.5 1.4 2.3 2.2 0.6
0.1 -0.2 -0.2 -0.1 0.4 1.3 1.3 0.8 0.5 1.0 0.8 -0.3 0.8 0.4 0.8 1.4 2.3 1.4 1.8 2.6 2.4 1.0 0.7 1.4 2.3 2.0 2.6 2.9 1.5 1.3 1.2 3.4 3.2 2.1 3.7 0.6
1.3 2.0 1.6 1.1 1.7 1.1 0.9 0.1 1.2 1.6 0.7 1.1 2.0 2.6 2.0 1.8 1.1 1.6 1.6 1.8 0.5 1.0 1.6 3.3 4.0 6.4 5.0 2.8 1.1 0.6 0.7 2.1 2.5 2.8 4.3 3.0
2.0 2.0 1.3 0.6 1.3 3.3 5.8 0.9 2.3 2.8 0.5 0.4 1.0 2.0 2.4 2.0 1.3 1.7 3.2 3.7 2.9 3.5 2.9 3.5 4.4 4.6 4.1 2.3 1.9 1.2 -0.8 2.3 2.4 2.8 3.2 2.6
0.4 0.0 -0.2 -1.2 -1.4 -0.5 -0.9 -1.6 -1.9 -0.9 -1.3 -0.3 0.0 0.5 0.5 0.1 1.5 4.2 2.5 0.5 3.7 5.9 3.6 2.0 2.3 1.8 1.6 1.3 0.5 1.5 2.1 2.1 1.5 -0.2 1.8 -0.4
-0.5 -0.3 0.1 -0.2 -0.1 -0.7 -0.1 -0.3 -0.5 0.1 0.5 0.3 0.1 -0.5 -0.4 0.2 0.1 0.9 0.8 -0.3 -1.1 -0.7 0.0 -1.4 -0.2 -1.9 -2.2 -3.2 -2.9 -2.7 0.7 0.7 -1.5 -1.2 -1.4 -0.8
0.5 0.0 0.3 0.4 0.5 0.3 0.0 0.8 -0.3 -0.5 -1.3 -0.6 0.5 -0.2 -0.3 -0.1 -0.6 -0.5 -0.2 -1.0 -1.3 -0.9 -1.2 -0.5 -0.6 -1.6 -2.6 -3.4 -4.0 -3.9 -2.5 -2.1 -0.5 -0.9 -2.2 0.0
-0.1 0.1 0.5 -0.3 0.1 0.2 -1.0 -1.0 -0.5 -0.8 -1.4 -2.0 -1.5 -1.7 -2.2 -2.1 -3.3 -3.0 -2.0 -1.1 -1.5 -1.6 -1.6 -1.9 -2.0 -1.9 -1.7 -2.4 -2.4 -0.6 -0.5 -1.4 -1.2 -1.5 -0.8 -0.4
-0.8 -2.6 -1.5 -1.8 -2.2 -2.6 -2.4 -2.4 -3.2 -3.2 -2.2 -2.0 -2.5 -1.7 -2.1 -1.3
-3.8 -5.3 -3.4 -2.0 -2.2 -3.7 -3.4

Figure 24. SATOB 101 - 400 hPa mean RMS O-B vector differences (ms-1). MAY 2003
All observations
Values are plotted where greater than 10 obs are present


150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
5.4 5.6 6.3 6.9 9.9 4.9 5.9 7.0 12.0 8.6 10.8 9.1 7.5 8.1 9.1 8.2
7.7 6.4 5.2 5.2 5.9 5.9 5.7 5.4 5.7 5.0 5.3 5.4 5.7 5.9 9.0 10.9 9.4 6.5 7.5 7.3 6.7 6.7 7.2 7.1 6.5 6.3 7.8 7.4 7.4 14.5 17.8 18.9 13.3 8.8
7.9 8.7 6.1 5.9 5.5 5.7 5.7 5.8 6.5 6.5 5.9 6.4 6.4 6.9 7.8 8.0 7.9 7.9 6.8 6.4 5.6 5.6 6.2 6.4 6.1 7.0 7.2 7.2 7.3 7.8 8.5 8.9 8.0 7.2 7.7 8.0
5.8 6.8 6.0 5.5 5.2 5.3 5.9 6.3 6.3 6.5 6.3 6.0 5.5 6.1 6.7 6.9 7.2 6.7 5.6 5.4 5.6 6.7 7.9 8.8 9.3 9.2 9.0 9.1 8.7 8.0 7.3 7.3 7.9 7.6 6.3 5.4
7.0 5.7 5.0 4.9 5.7 5.4 5.4 6.2 5.9 5.3 5.6 5.1 6.6 7.3 7.7 8.2 9.1 8.7 8.7 7.6 8.5 9.6 10.1 9.7 16.8 11.9 9.8 8.2 7.1 6.7 6.2 6.5 6.6 7.8 7.2 5.4
6.2 5.7 6.1 5.8 6.0 5.8 5.4 5.8 5.7 5.5 6.1 7.3 6.7 6.3 7.4 8.6 9.3 8.8 7.5 7.5 8.4 7.6 6.2 6.1 6.6 6.7 7.9 7.1 6.5 6.4 6.2 6.6 7.0 7.6 9.5 7.8
6.9 6.7 6.2 6.5 6.4 6.2 5.7 6.1 7.0 6.4 6.6 6.8 6.8 7.3 7.2 8.0 7.7 7.9 7.6 7.6 9.0 8.4 6.9 7.4 8.8 10.6 9.8 7.8 6.9 6.7 7.0 5.7 6.1 6.0 7.6 6.9
6.0 6.1 5.7 5.5 5.5 8.1 8.7 7.9 9.1 8.9 6.8 6.4 6.5 7.4 7.7 8.3 8.6 8.1 9.9 8.7 8.0 10.6 8.1 8.3 9.5 10.0 8.7 7.5 6.6 6.7 7.1 5.9 6.3 6.4 6.7 6.5
5.6 5.5 5.7 5.8 5.5 5.2 5.3 7.6 8.2 8.7 7.6 6.1 6.4 6.4 6.9 7.0 8.6 11.3 10.3 8.1 10.1 12.3 11.1 8.7 7.3 7.9 8.1 7.0 7.8 7.8 6.7 7.0 7.2 6.7 7.3 6.1
6.1 6.1 6.5 5.5 5.5 5.6 5.6 5.8 6.0 6.3 6.5 6.8 7.4 7.6 7.7 6.8 7.3 7.0 7.5 7.8 8.4 10.4 9.8 9.0 7.6 9.1 10.4 11.9 11.8 11.2 8.7 8.8 9.4 8.4 7.8 7.3
6.8 6.3 6.2 6.4 6.6 6.2 6.7 6.3 6.1 6.3 5.8 6.5 7.1 7.8 8.6 8.5 8.9 8.9 7.9 8.0 9.9 8.9 8.5 9.2 8.4 9.0 10.6 11.6 12.9 12.8 8.0 7.9 6.6 7.2 8.7 7.5
5.5 5.5 5.4 5.2 5.6 7.1 7.2 7.0 7.0 6.7 5.9 7.2 7.1 9.4 10.6 10.9 11.5 10.9 10.2 9.5 9.1 9.0 8.8 10.2 9.9 9.1 8.7 9.2 9.1 6.5 6.9 7.3 7.0 6.6 7.0 6.4
7.8 9.4 8.7 9.2 10.0 10.3 10.7 10.8 10.8 11.3 11.0 10.7 9.8 8.8 8.1 7.9
9.4 11.0 9.2 10.0 27.8 10.9 10.5

MONITORING OF SATELLITE TEMPERATURES

MONITORING CENTRE: BRACKNELL

MONTH: May 2003

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from NOAA-15, NOAA-16 and NOAA-17.

Standard of comparison :Background field from UKMO global model.

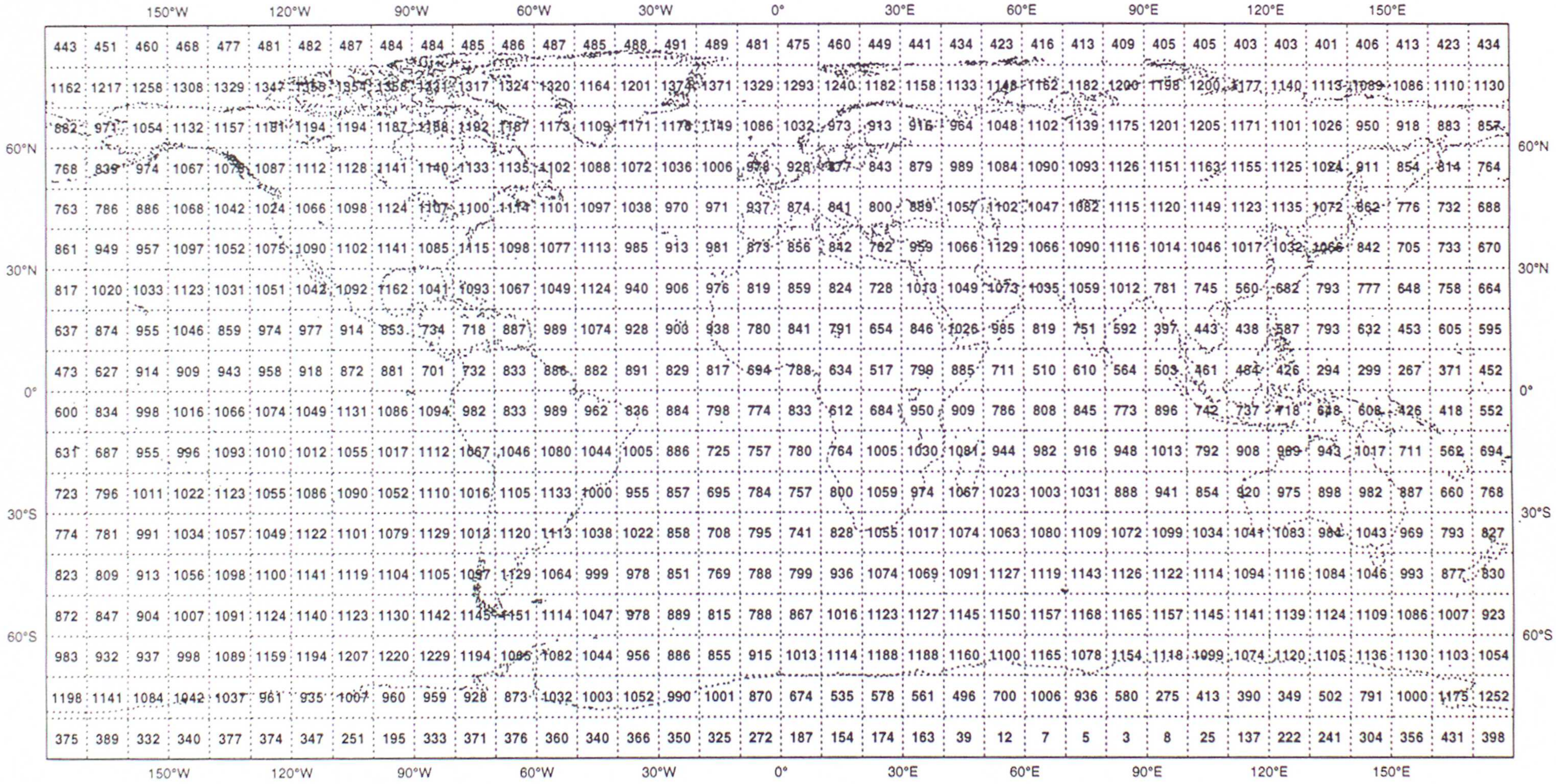
Selection Criteria :All soundings.

Data Extracted :Sounding channels (and approximate weighting function peaks, hPa)

HIRS8 (Surface)
HIRS15 (700)
HIRS11 (500-700)
HIRS4 (400)
AMSUA5 (700)
AMSUA7 (300)
AMSUA9 (100)

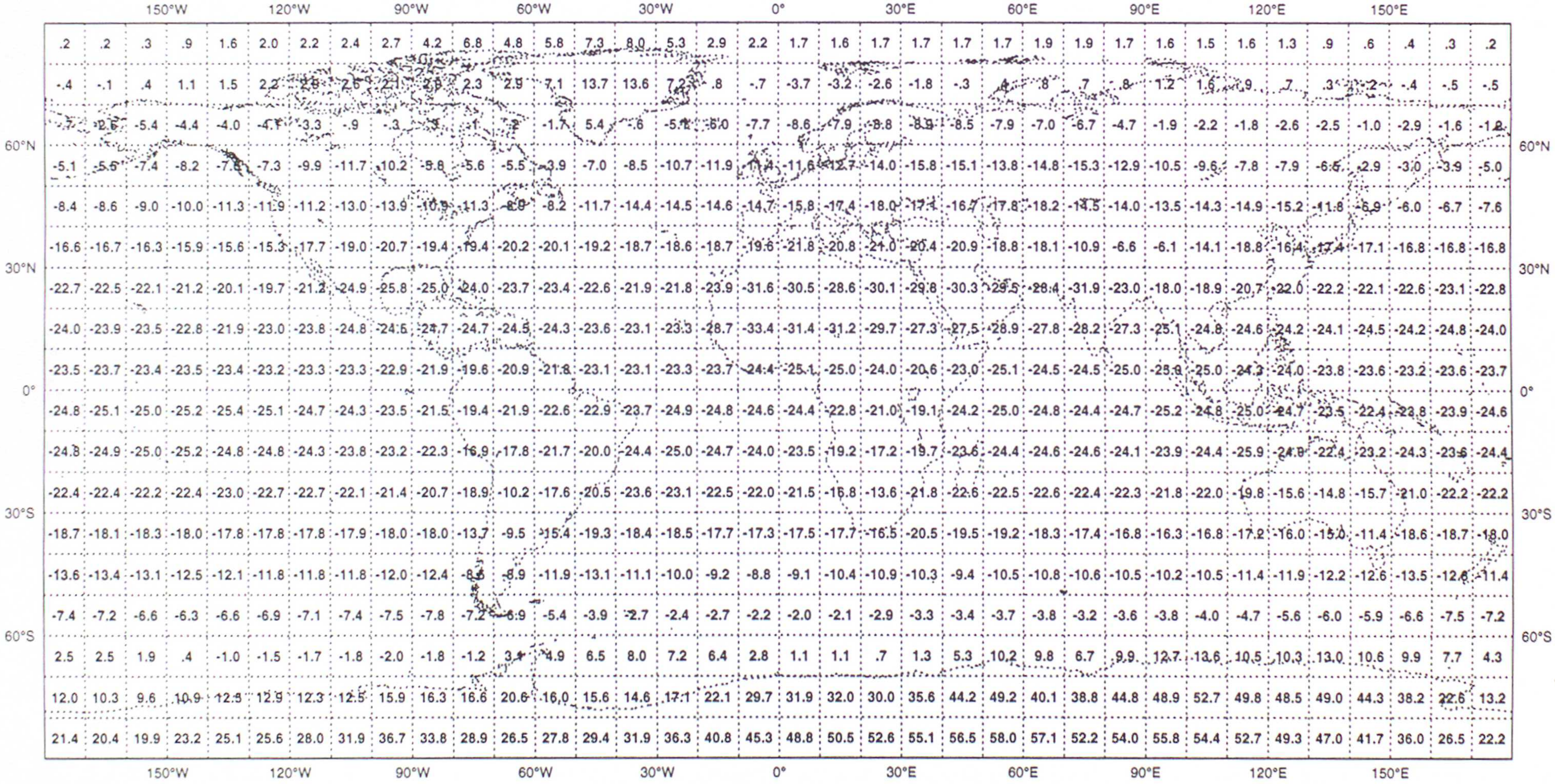
:Mean and standard deviation observation-minus-background brightness temperature differences

Figure 25. ATOVS mean daily count. MAY 2003
NOAA15, using all observations
Global average number of observations in 24 hours = 579705



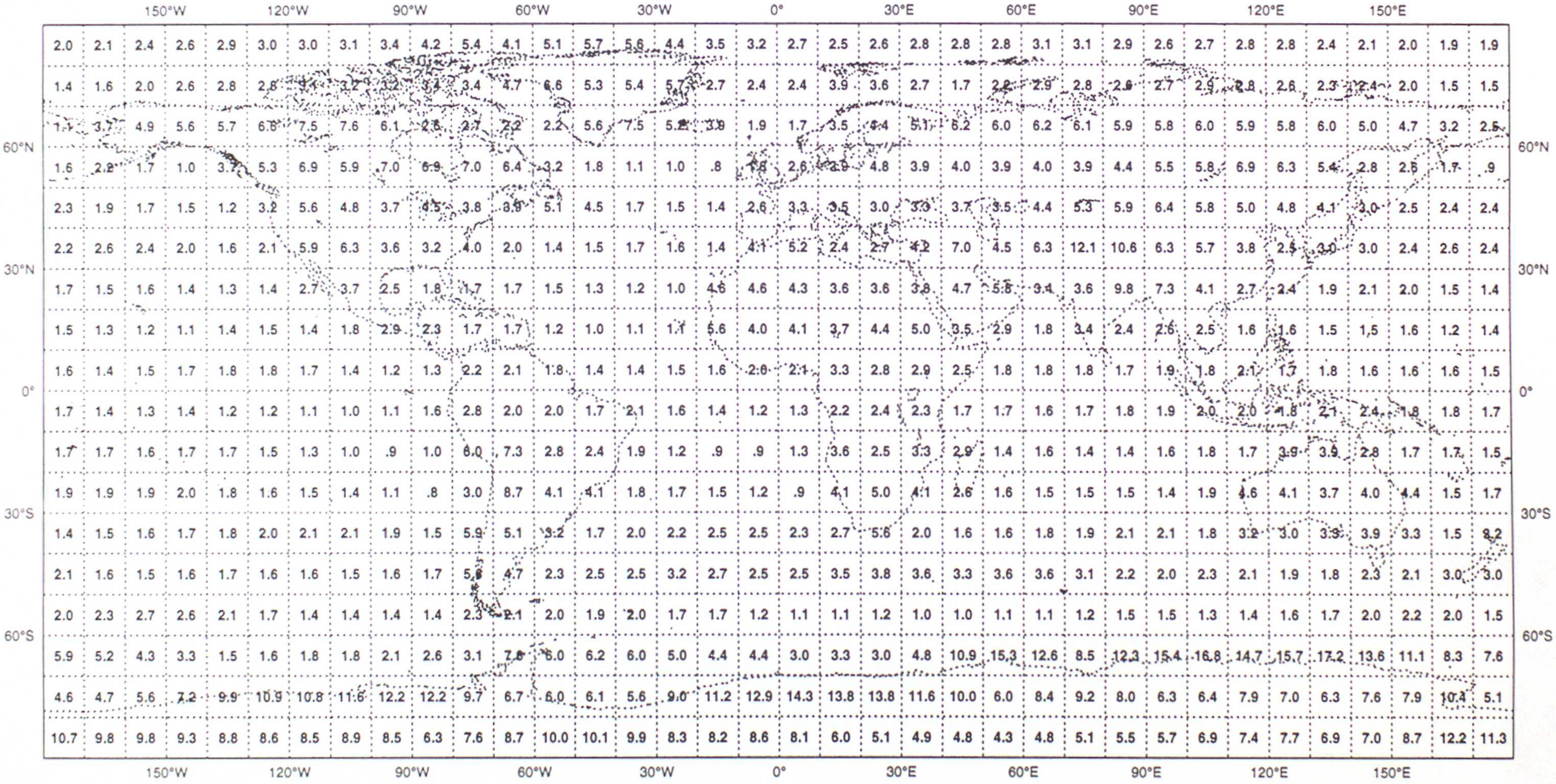
443	451	460	468	477	481	482	487	484	484	485	486	487	485	488	491	489	481	475	460	449	441	434	423	416	413	409	405	405	403	403	401	406	413	423	434
1162	1217	1258	1308	1329	1347	1358	1354	1356	1331	1317	1324	1320	1164	1201	1374	1371	1329	1293	1240	1182	1158	1133	1148	1162	1182	1200	1198	1200	1177	1140	1113	1089	1086	1110	1130
882	971	1054	1132	1157	1181	1194	1194	1187	1188	1192	1187	1173	1109	1171	1178	1149	1086	1032	973	913	916	964	1048	1102	1139	1175	1201	1205	1171	1101	1026	950	918	883	857
768	839	974	1067	1078	1087	1112	1128	1141	1140	1133	1135	1102	1088	1072	1036	1006	978	928	877	843	879	989	1084	1090	1093	1126	1151	1163	1155	1125	1024	911	854	814	764
763	786	886	1068	1042	1024	1066	1098	1124	1107	1100	1114	1101	1097	1038	970	971	937	874	841	800	889	1057	1102	1047	1082	1115	1120	1149	1123	1135	1072	862	776	732	688
861	949	957	1097	1052	1075	1090	1102	1141	1085	1115	1098	1077	1113	985	913	981	873	856	842	762	959	1066	1129	1066	1090	1116	1014	1046	1017	1032	1066	842	705	733	670
817	1020	1033	1123	1031	1051	1042	1092	1162	1041	1093	1067	1049	1124	940	906	976	819	859	824	728	1013	1049	1073	1035	1059	1012	781	745	560	682	793	777	648	758	664
637	874	955	1046	859	974	977	914	853	734	718	887	989	1074	928	903	938	780	841	791	654	846	1026	985	819	751	592	397	443	438	587	793	632	453	605	595
473	627	914	909	943	958	918	872	881	701	732	833	886	882	891	829	817	694	788	634	517	799	885	711	510	610	564	503	461	484	426	294	299	267	371	452
600	834	998	1016	1066	1074	1049	1131	1086	1094	982	833	989	962	836	884	798	774	833	612	684	950	909	786	808	845	773	896	742	737	718	638	608	426	418	552
631	687	955	996	1093	1010	1012	1055	1017	1112	1067	1046	1080	1044	1005	886	725	757	780	764	1005	1030	1081	944	982	916	948	1013	792	908	989	943	1017	711	562	694
723	796	1011	1022	1123	1055	1086	1090	1052	1110	1016	1105	1133	1000	955	857	695	784	757	800	1059	974	1067	1023	1003	1031	888	941	854	920	975	898	982	887	660	768
774	781	991	1034	1057	1049	1122	1101	1079	1129	1013	1120	1113	1038	1022	858	708	795	741	828	1055	1017	1074	1063	1080	1109	1072	1099	1034	1041	1083	984	1043	969	793	827
823	809	913	1056	1098	1100	1141	1119	1104	1105	1097	1129	1064	999	978	851	769	788	799	936	1074	1069	1091	1127	1119	1143	1126	1122	1114	1094	1116	1084	1046	993	877	830
872	847	904	1007	1091	1124	1140	1123	1130	1142	1145	1151	1114	1047	978	889	815	788	867	1016	1123	1127	1145	1150	1157	1168	1165	1157	1145	1141	1139	1124	1109	1086	1007	923
983	932	937	998	1089	1159	1194	1207	1220	1229	1194	1085	1082	1044	956	886	855	915	1013	1114	1188	1188	1160	1100	1165	1078	1154	1118	1099	1074	1120	1105	1136	1130	1103	1054
1198	1141	1084	1042	1037	961	935	1007	960	959	928	873	1032	1003	1052	990	1001	870	674	535	578	561	496	700	1006	936	580	275	413	390	349	502	791	1000	1175	1252
375	389	332	340	377	374	347	251	195	333	371	376	360	340	366	350	325	272	187	154	174	163	39	12	7	5	3	8	25	137	222	241	304	356	431	398

Figure 26. ATOVS MEAN O-B brightness temperature differences (deg C). MAY 2003
Channel: HIRS8 (Surface)
NOAA15, using all observations



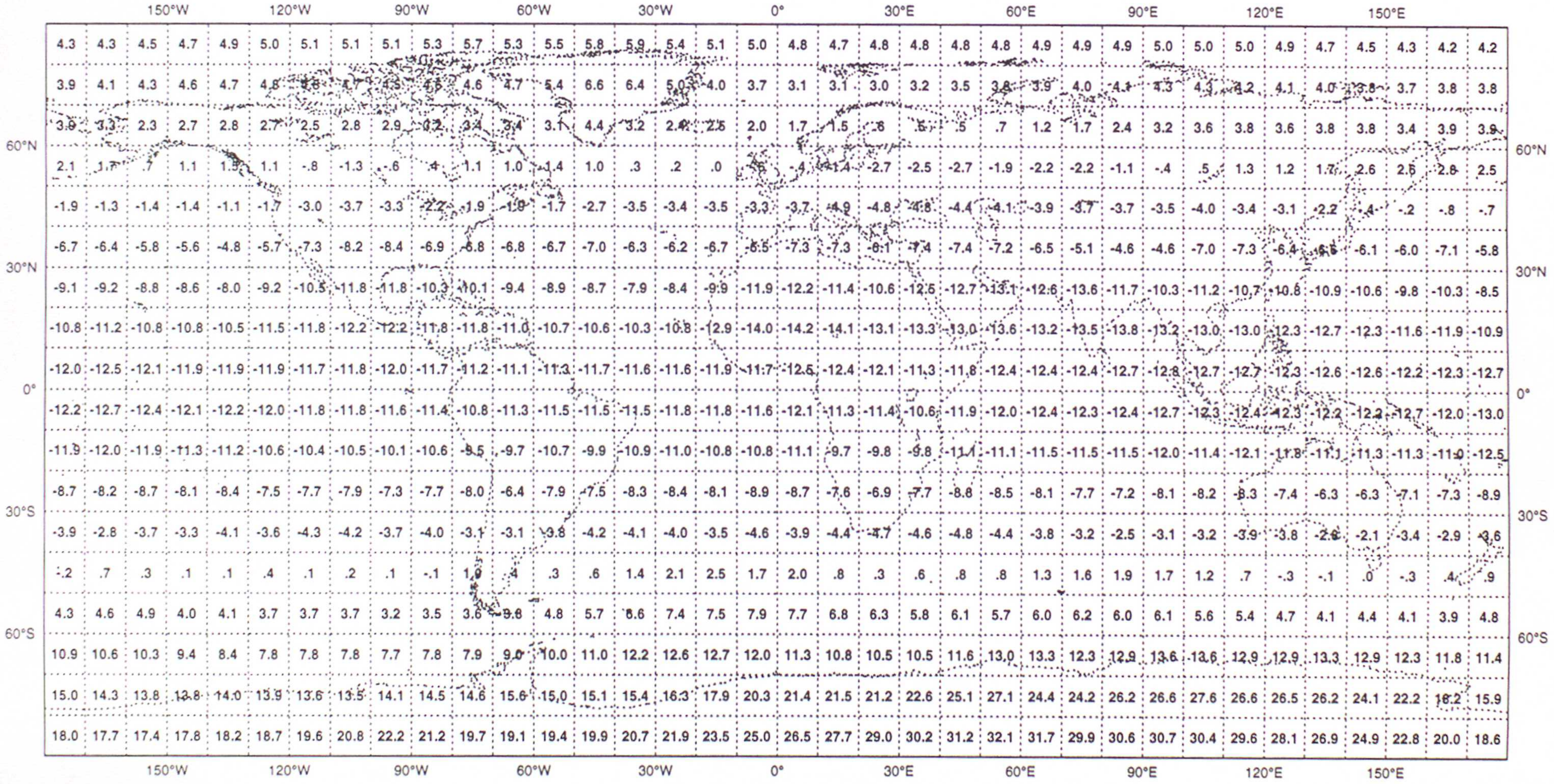
.2	.2	.3	.9	1.6	2.0	2.2	2.4	2.7	4.2	6.8	4.8	5.8	7.3	8.0	5.3	2.9	2.2	1.7	1.6	1.7	1.7	1.7	1.7	1.9	1.9	1.7	1.6	1.5	1.6	1.3	.9	.6	.4	.3	.2
-.4	-.1	.4	1.1	1.5	2.2	2.8	2.6	2.1	2.0	2.3	2.9	7.1	13.7	13.6	7.2	.8	-.7	-3.7	-3.2	-2.6	-1.8	-.3	.4	.8	.7	.8	1.2	1.6	.9	.7	.3	-.2	-.4	-.5	-.5
-.7	-2.6	-5.4	-4.4	-4.0	-4.1	-3.3	-.9	-.3	-.3	-.1	-.2	-1.7	5.4	-.6	-5.1	-6.0	-7.7	-8.6	-7.9	-8.8	-8.9	-8.5	-7.9	-7.0	-6.7	-4.7	-1.9	-2.2	-1.8	-2.6	-2.5	-1.0	-2.9	-1.6	-1.2
-5.1	-5.6	-7.4	-8.2	-7.8	-7.3	-9.9	-11.7	-10.2	-5.8	-5.6	-5.5	-3.9	-7.0	-8.5	-10.7	-11.9	-11.4	-11.6	-12.7	-14.0	-15.8	-15.1	-13.8	-14.8	-15.3	-12.9	-10.5	-9.6	-7.8	-7.9	-6.5	-2.9	-3.0	-3.9	-5.0
-8.4	-8.6	-9.0	-10.0	-11.3	-11.9	-11.2	-13.0	-13.9	-10.9	-11.3	-8.9	-8.2	-11.7	-14.4	-14.5	-14.6	-14.7	-15.8	-17.4	-18.0	-17.1	-16.7	-17.8	-18.2	-14.5	-14.0	-13.5	-14.3	-14.9	-15.2	-11.8	-6.9	-6.0	-6.7	-7.6
-16.6	-16.7	-16.3	-15.9	-15.6	-15.3	-17.7	-19.0	-20.7	-19.4	-19.4	-20.2	-20.1	-19.2	-18.7	-18.6	-18.7	-19.6	-21.8	-20.8	-21.0	-20.4	-20.9	-18.8	-18.1	-10.9	-6.6	-6.1	-14.1	-18.8	-16.4	-17.4	-17.1	-16.8	-16.8	-16.8
-22.7	-22.5	-22.1	-21.2	-20.1	-19.7	-21.2	-24.9	-25.8	-25.0	-24.0	-23.7	-23.4	-22.6	-21.9	-21.8	-23.9	-31.6	-30.5	-28.6	-30.1	-29.8	-30.3	-29.5	-28.4	-31.9	-23.0	-18.0	-18.9	-20.7	-22.0	-22.2	-22.1	-22.6	-23.1	-22.8
-24.0	-23.9	-23.5	-22.8	-21.9	-23.0	-23.8	-24.8	-24.5	-24.7	-24.7	-24.5	-24.3	-23.6	-23.1	-23.3	-28.7	-33.4	-31.4	-31.2	-29.7	-27.3	-27.5	-28.9	-27.8	-28.2	-27.3	-25.1	-24.8	-24.6	-24.2	-24.1	-24.5	-24.2	-24.8	-24.0
-23.5	-23.7	-23.4	-23.5	-23.4	-23.2	-23.3	-23.3	-22.9	-21.9	-19.6	-20.9	-21.8	-23.1	-23.1	-23.3	-23.7	-24.4	-25.1	-25.0	-24.0	-20.6	-23.0	-25.1	-24.5	-24.5	-25.0	-25.9	-25.0	-24.3	-24.0	-23.8	-23.6	-23.2	-23.6	-23.7
-24.8	-25.1	-25.0	-25.2	-25.4	-25.1	-24.7	-24.3	-23.5	-21.5	-19.4	-21.9	-22.6	-22.9	-23.7	-24.9	-24.8	-24.6	-24.4	-22.8	-21.0	-19.1	-24.2	-25.0	-24.8	-24.4	-24.7	-25.2	-24.8	-25.0	-24.7	-23.5	-22.4	-23.8	-23.9	-24.6
-24.8	-24.9	-25.0	-25.2	-24.8	-24.8	-24.3	-23.8	-23.2	-22.3	-16.9	-17.8	-21.7	-20.0	-24.4	-25.0	-24.7	-24.0	-23.5	-19.2	-17.2	-19.7	-23.6	-24.4	-24.6	-24.6	-24.1	-23.9	-24.4	-25.9	-24.9	-22.4	-23.2	-24.3	-23.6	-24.4
-22.4	-22.4	-22.2	-22.4	-23.0	-22.7	-22.7	-22.1	-21.4	-20.7	-18.9	-10.2	-17.6	-20.5	-23.6	-23.1	-22.5	-22.0	-21.5	-16.8	-13.6	-21.8	-22.6	-22.5	-22.6	-22.4	-22.3	-21.8	-22.0	-19.8	-15.6	-14.8	-15.7	-21.0	-22.2	-22.2
-18.7	-18.1	-18.3	-18.0	-17.8	-17.8	-17.8	-17.9	-18.0	-18.0	-13.7	-9.5	-15.4	-19.3	-18.4	-18.5	-17.7	-17.3	-17.5	-17.7	-16.5	-20.5	-19.5	-19.2	-18.3	-17.4	-16.8	-16.3	-16.8	-17.2	-16.0	-15.0	-11.4	-18.6	-18.7	-18.0
-13.6	-13.4	-13.1	-12.5	-12.1	-11.8	-11.8	-11.8	-12.0	-12.4	-8.6	-8.9	-11.9	-13.1	-11.1	-10.0	-9.2	-8.8	-9.1	-10.4	-10.9	-10.3	-9.4	-10.5	-10.8	-10.6	-10.5	-10.2	-10.5	-11.4	-11.9	-12.2	-12.6	-13.5	-12.6	-11.4
-7.4	-7.2	-6.6	-6.3	-6.6	-6.9	-7.1	-7.4	-7.5	-7.8	-7.2	-6.9	-5.4	-3.9	-2.7	-2.4	-2.7	-2.2	-2.0	-2.1	-2.9	-3.3	-3.4	-3.7	-3.8	-3.2	-3.6	-3.8	-4.0	-4.7	-5.6	-6.0	-5.9	-6.6	-7.5	-7.2
2.5	2.5	1.9	.4	-1.0	-1.5	-1.7	-1.8	-2.0	-1.8	-1.2	3.4	4.9	6.5	8.0	7.2	6.4	2.8	1.1	1.1	.7	1.3	5.3	10.2	9.8	6.7	9.9	12.7	13.6	10.5	10.3	13.0	10.6	9.9	7.7	4.3
12.0	10.3	9.6	10.9	12.5	12.9	12.3	12.5	15.9	16.3	16.6	20.6	16.0	15.6	14.6	17.1	22.1	29.7	31.9	32.0	30.0	35.6	44.2	49.2	40.1	38.8	44.8	48.9	52.7	49.8	48.5	49.0	44.3	38.2	22.6	13.2
21.4	20.4	19.9	23.2	25.1	25.6	28.0	31.9	36.7	33.8	28.9	26.5	27.8	29.4	31.9	36.3	40.8	45.3	48.8	50.5	52.6	55.1	56.5	58.0	57.1	52.2	54.0	55.8	54.4	52.7	49.3	47.0	41.7	36.0	26.5	22.2

Figure 27. ATOVS SD O-B brightness temperature differences (deg C). MAY 2003
Channel: HIRS8 (Surface)
NOAA15, using all observations



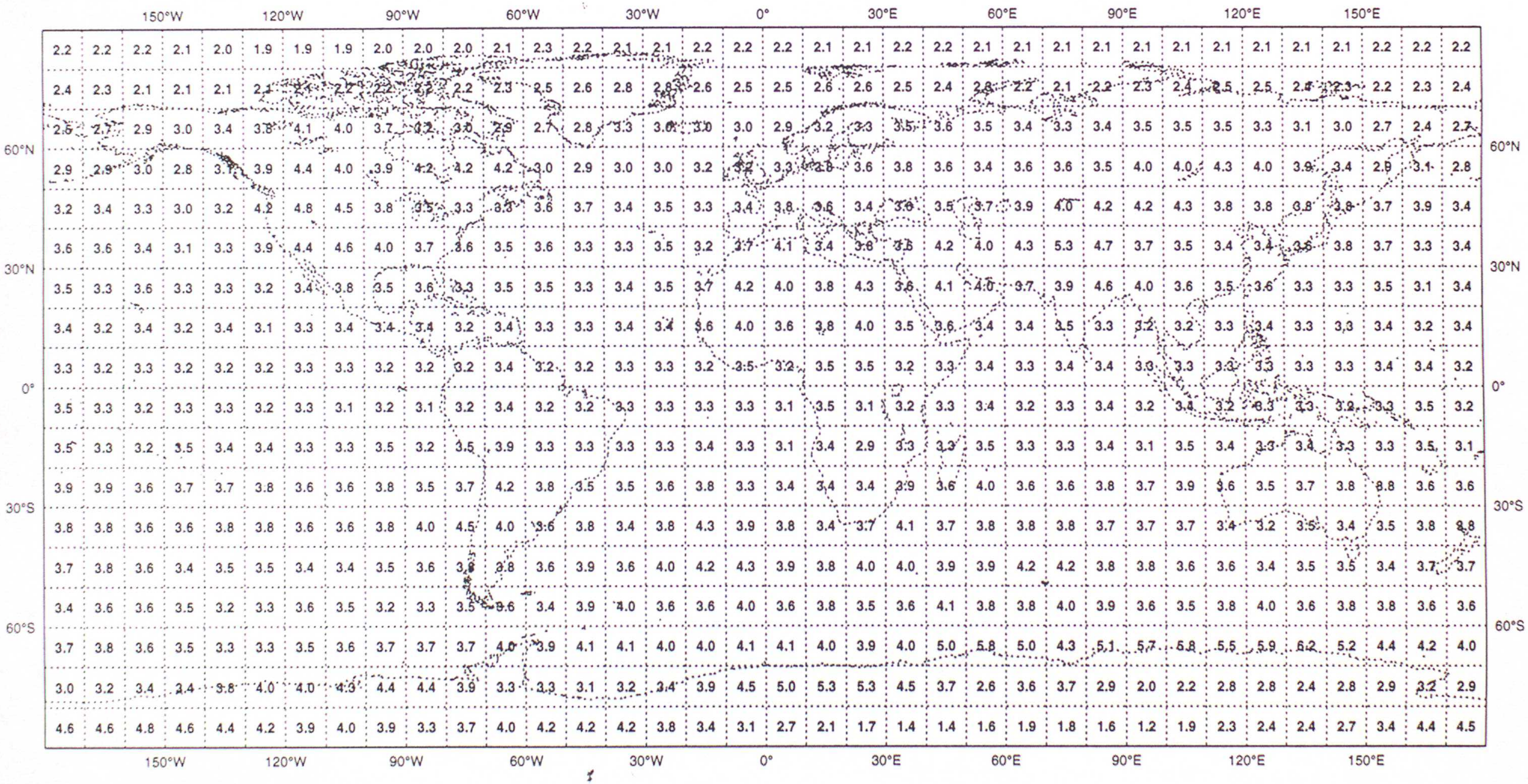
2.0	2.1	2.4	2.6	2.9	3.0	3.0	3.1	3.4	4.2	5.4	4.1	5.1	5.7	5.6	4.4	3.5	3.2	2.7	2.5	2.6	2.8	2.8	2.8	3.1	3.1	2.9	2.6	2.7	2.8	2.8	2.4	2.1	2.0	1.9	1.9
1.4	1.6	2.0	2.6	2.8	2.8	3.4	3.2	3.2	3.4	3.4	4.7	6.6	5.3	5.4	5.7	2.7	2.4	2.4	3.9	3.6	2.7	1.7	2.2	2.9	2.8	2.9	2.7	2.9	2.8	2.6	2.3	2.4	2.0	1.5	1.5
1.1	3.7	4.9	5.6	5.7	6.6	7.5	7.6	6.1	2.6	2.7	2.2	2.2	5.6	7.5	5.2	3.9	1.9	1.7	3.5	4.4	5.1	6.2	6.0	6.2	6.1	5.9	5.8	6.0	5.9	5.8	6.0	5.0	4.7	3.2	2.5
1.6	2.2	1.7	1.0	3.7	5.3	6.9	5.9	7.0	6.9	7.0	6.4	3.2	1.8	1.1	1.0	.8	1.8	2.6	2.9	4.8	3.9	4.0	3.9	4.0	3.9	4.4	5.5	5.8	6.9	6.3	5.4	2.8	2.6	1.7	.9
2.3	1.9	1.7	1.5	1.2	3.2	5.6	4.8	3.7	4.5	3.8	3.9	5.1	4.5	1.7	1.5	1.4	2.6	3.3	3.5	3.0	3.3	3.7	3.5	4.4	5.3	5.9	6.4	5.8	5.0	4.8	4.1	3.0	2.5	2.4	2.4
2.2	2.6	2.4	2.0	1.6	2.1	5.9	6.3	3.6	3.2	4.0	2.0	1.4	1.5	1.7	1.6	1.4	4.1	5.2	2.4	2.7	4.2	7.0	4.5	6.3	12.1	10.6	6.3	5.7	3.8	2.5	3.0	3.0	2.4	2.6	2.4
1.7	1.5	1.6	1.4	1.3	1.4	2.7	3.7	2.5	1.8	1.7	1.7	1.5	1.3	1.2	1.0	4.6	4.6	4.3	3.6	3.6	3.8	4.7	5.8	3.4	3.6	9.8	7.3	4.1	2.7	2.4	1.9	2.1	2.0	1.5	1.4
1.5	1.3	1.2	1.1	1.4	1.5	1.4	1.8	2.9	2.3	1.7	1.7	1.2	1.0	1.1	1.1	5.6	4.0	4.1	3.7	4.4	5.0	3.5	2.9	1.8	3.4	2.4	2.6	2.5	1.6	1.6	1.5	1.5	1.6	1.2	1.4
1.6	1.4	1.5	1.7	1.8	1.8	1.7	1.4	1.2	1.3	2.2	2.1	1.8	1.4	1.4	1.5	1.6	2.0	2.1	3.3	2.8	2.9	2.5	1.8	1.8	1.8	1.7	1.9	1.8	2.1	1.7	1.8	1.6	1.6	1.6	1.5
1.7	1.4	1.3	1.4	1.2	1.2	1.1	1.0	1.1	1.6	2.8	2.0	2.0	1.7	2.1	1.6	1.4	1.2	1.3	2.2	2.4	2.3	1.7	1.7	1.6	1.7	1.8	1.9	2.0	2.0	1.8	2.1	2.4	1.8	1.8	1.7
1.7	1.7	1.6	1.7	1.7	1.5	1.3	1.0	.9	1.0	6.0	7.3	2.8	2.4	1.9	1.2	.9	.9	1.3	3.6	2.5	3.3	2.9	1.4	1.6	1.4	1.4	1.6	1.8	1.7	3.9	3.9	2.8	1.7	1.7	1.5
1.9	1.9	1.9	2.0	1.8	1.6	1.5	1.4	1.1	.8	3.0	8.7	4.1	4.1	1.8	1.7	1.5	1.2	.9	4.1	5.0	4.1	2.6	1.6	1.5	1.5	1.5	1.4	1.9	4.6	4.1	3.7	4.0	4.4	1.5	1.7
1.4	1.5	1.6	1.7	1.8	2.0	2.1	2.1	1.9	1.5	5.9	5.1	3.2	1.7	2.0	2.2	2.5	2.5	2.3	2.7	5.6	2.0	1.6	1.6	1.8	1.9	2.1	2.1	1.8	3.2	3.0	3.3	3.9	3.3	1.5	8.2
2.1	1.6	1.5	1.6	1.7	1.6	1.6	1.5	1.6	1.7	5.6	4.7	2.3	2.5	2.5	3.2	2.7	2.5	2.5	3.5	3.8	3.6	3.3	3.6	3.6	3.1	2.2	2.0	2.3	2.1	1.9	1.8	2.3	2.1	3.0	3.0
2.0	2.3	2.7	2.6	2.1	1.7	1.4	1.4	1.4	1.4	2.3	2.1	2.0	1.9	2.0	1.7	1.7	1.2	1.1	1.1	1.2	1.0	1.0	1.1	1.1	1.2	1.5	1.5	1.3	1.4	1.6	1.7	2.0	2.2	2.0	1.5
5.9	5.2	4.3	3.3	1.5	1.6	1.8	1.8	2.1	2.6	3.1	7.6	6.0	6.2	6.0	5.0	4.4	4.4	3.0	3.3	3.0	4.8	10.9	15.3	12.6	8.5	12.3	15.4	16.8	14.7	15.7	17.2	13.6	11.1	8.3	7.6
4.6	4.7	5.6	7.2	9.9	10.9	10.8	11.6	12.2	12.2	9.7	6.7	6.0	6.1	5.6	9.0	11.2	12.9	14.3	13.8	13.8	11.6	10.0	6.0	8.4	9.2	8.0	6.3	6.4	7.9	7.0	6.3	7.6	7.9	10.4	5.1
10.7	9.8	9.8	9.3	8.8	8.6	8.5	8.9	8.5	6.3	7.6	8.7	10.0	10.1	9.9	8.3	8.2	8.6	8.1	6.0	5.1	4.9	4.8	4.3	4.8	5.1	5.5	5.7	6.9	7.4	7.7	6.9	7.0	8.7	12.2	11.3

Figure 28. ATOVS MEAN O-B brightness temperature differences (deg C). MAY 2003
Channel: HIRS15 (700 hPa)
NOAA15, using all observations



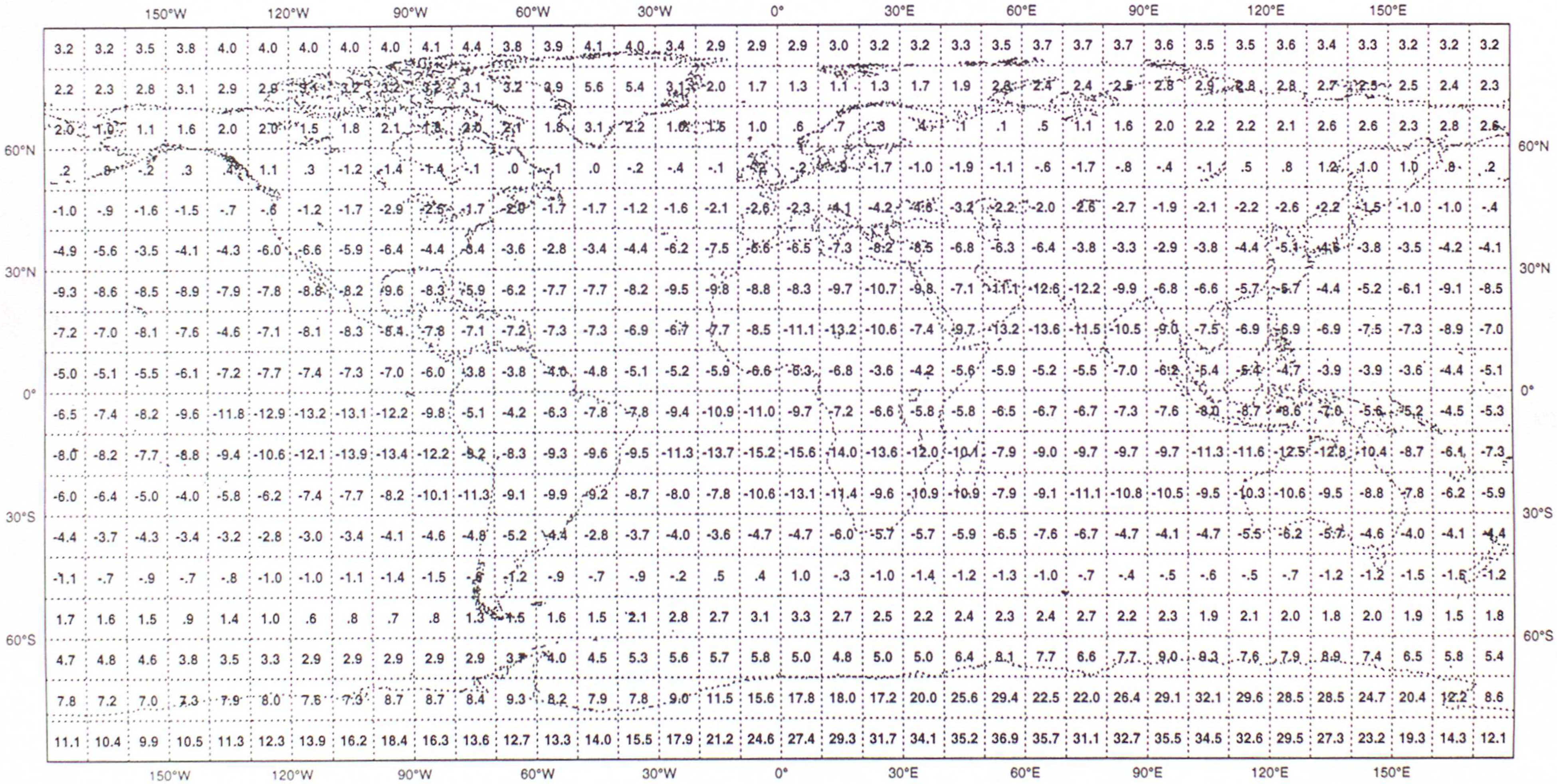
4.3	4.3	4.5	4.7	4.9	5.0	5.1	5.1	5.1	5.3	5.7	5.3	5.5	5.8	5.9	5.4	5.1	5.0	4.8	4.7	4.8	4.8	4.8	4.8	4.9	4.9	4.9	5.0	5.0	5.0	4.9	4.7	4.5	4.3	4.2	4.2
3.9	4.1	4.3	4.6	4.7	4.8	4.8	4.7	4.5	4.5	4.6	4.7	5.4	6.6	6.4	5.0	4.0	3.7	3.1	3.1	3.0	3.2	3.5	3.8	3.9	4.0	4.1	4.3	4.3	4.2	4.1	4.0	3.8	3.7	3.8	3.8
3.9	3.3	2.3	2.7	2.8	2.7	2.5	2.8	2.9	2.2	3.4	3.4	3.1	4.4	3.2	2.4	2.5	2.0	1.7	1.5	.6	.5	.5	.7	1.2	1.7	2.4	3.2	3.6	3.8	3.6	3.8	3.8	3.4	3.9	3.9
2.1	1.7	.7	1.1	1.5	1.1	-.8	-1.3	-.6	.4	1.1	1.0	1.4	1.0	.3	.2	.0	.6	-.4	-1.4	-2.7	-2.5	-2.7	-1.9	-2.2	-2.2	-1.1	-.4	.5	1.3	1.2	1.7	2.6	2.6	2.8	2.5
-1.9	-1.3	-1.4	-1.4	-1.1	-1.7	-3.0	-3.7	-3.3	-2.2	-1.9	-1.9	-1.7	-2.7	-3.5	-3.4	-3.5	-3.3	-3.7	-4.9	-4.8	-4.8	-4.4	-4.1	-3.9	-3.7	-3.7	-3.5	-4.0	-3.4	-3.1	-2.2	-.4	-.2	-.8	-.7
-6.7	-6.4	-5.8	-5.6	-4.8	-5.7	-7.3	-8.2	-8.4	-6.9	-6.8	-6.8	-6.7	-7.0	-6.3	-6.2	-6.7	-6.5	-7.3	-7.3	-6.1	-7.4	-7.4	-7.2	-6.5	-5.1	-4.6	-4.6	-7.0	-7.3	-6.4	-6.6	-6.1	-6.0	-7.1	-5.8
-9.1	-9.2	-8.8	-8.6	-8.0	-9.2	-10.5	-11.8	-11.8	-10.3	-10.1	-9.4	-8.9	-8.7	-7.9	-8.4	-9.9	-11.9	-12.2	-11.4	-10.6	-12.5	-12.7	-13.1	-12.6	-13.6	-11.7	-10.3	-11.2	-10.7	-10.8	-10.9	-10.6	-9.8	-10.3	-8.5
-10.8	-11.2	-10.8	-10.8	-10.5	-11.5	-11.8	-12.2	-12.2	-11.8	-11.8	-11.0	-10.7	-10.6	-10.3	-10.8	-12.9	-14.0	-14.2	-14.1	-13.1	-13.3	-13.0	-13.6	-13.2	-13.5	-13.8	-13.2	-13.0	-13.0	-12.3	-12.7	-12.3	-11.6	-11.9	-10.9
-12.0	-12.5	-12.1	-11.9	-11.9	-11.9	-11.7	-11.8	-12.0	-11.7	-11.2	-11.1	-11.3	-11.7	-11.6	-11.6	-11.9	-11.7	-12.5	-12.4	-12.1	-11.3	-11.8	-12.4	-12.4	-12.4	-12.7	-12.8	-12.7	-12.7	-12.3	-12.6	-12.6	-12.2	-12.3	-12.7
-12.2	-12.7	-12.4	-12.1	-12.2	-12.0	-11.8	-11.8	-11.6	-11.4	-10.8	-11.3	-11.5	-11.5	-11.5	-11.8	-11.8	-11.6	-12.1	-11.3	-11.4	-10.6	-11.9	-12.0	-12.4	-12.3	-12.4	-12.7	-12.3	-12.4	-12.3	-12.2	-12.2	-12.7	-12.0	-13.0
-11.9	-12.0	-11.9	-11.3	-11.2	-10.6	-10.4	-10.5	-10.1	-10.6	-9.5	-9.7	-10.7	-9.9	-10.9	-11.0	-10.8	-10.8	-11.1	-9.7	-9.8	-9.8	-11.1	-11.1	-11.5	-11.5	-11.5	-12.0	-11.4	-12.1	-11.8	-11.1	-11.3	-11.3	-11.0	-12.5
-8.7	-8.2	-8.7	-8.1	-8.4	-7.5	-7.7	-7.9	-7.3	-7.7	-8.0	-6.4	-7.9	-7.5	-8.3	-8.4	-8.1	-8.9	-8.7	-7.6	-6.9	-7.7	-8.8	-8.5	-8.1	-7.7	-7.2	-8.1	-8.2	-8.3	-7.4	-6.3	-6.3	-7.1	-7.3	-8.9
-3.9	-2.8	-3.7	-3.3	-4.1	-3.6	-4.3	-4.2	-3.7	-4.0	-3.1	-3.1	-3.8	-4.2	-4.1	-4.0	-3.5	-4.6	-3.9	-4.4	-4.7	-4.6	-4.8	-4.4	-3.8	-3.2	-2.5	-3.1	-3.2	-3.9	-3.8	-2.6	-2.1	-3.4	-2.9	-3.6
-.2	.7	.3	.1	.1	.4	.1	.2	.1	-.1	1.9	.4	.3	.6	1.4	2.1	2.5	1.7	2.0	.8	.3	.6	.8	.8	1.3	1.6	1.9	1.7	1.2	.7	-.3	-.1	.0	-.3	.4	.9
4.3	4.6	4.9	4.0	4.1	3.7	3.7	3.7	3.2	3.5	3.6	3.8	4.8	5.7	6.6	7.4	7.5	7.9	7.7	6.8	6.3	5.8	6.1	5.7	6.0	6.2	6.0	6.1	5.6	5.4	4.7	4.1	4.4	4.1	3.9	4.8
10.9	10.6	10.3	9.4	8.4	7.8	7.8	7.8	7.7	7.8	7.9	9.0	10.0	11.0	12.2	12.6	12.7	12.0	11.3	10.8	10.5	10.5	11.6	13.0	13.3	12.3	12.9	13.6	13.6	12.9	12.9	13.3	12.9	12.3	11.8	11.4
15.0	14.3	13.8	13.8	14.0	13.9	13.6	13.5	14.1	14.5	14.6	15.6	15.0	15.1	15.4	16.3	17.9	20.3	21.4	21.5	21.2	22.6	25.1	27.1	24.4	24.2	26.2	26.6	27.6	26.6	26.5	26.2	24.1	22.2	18.2	15.9
18.0	17.7	17.4	17.8	18.2	18.7	19.6	20.8	22.2	21.2	19.7	19.1	19.4	19.9	20.7	21.9	23.5	25.0	26.5	27.7	29.0	30.2	31.2	32.1	31.7	29.9	30.6	30.7	30.4	29.6	28.1	26.9	24.9	22.8	20.0	18.6

Figure 29. ATOVS SD O-B brightness temperature differences (deg C). MAY 2003
Channel: HIRS15 (700 hPa)
NOAA15, using all observations



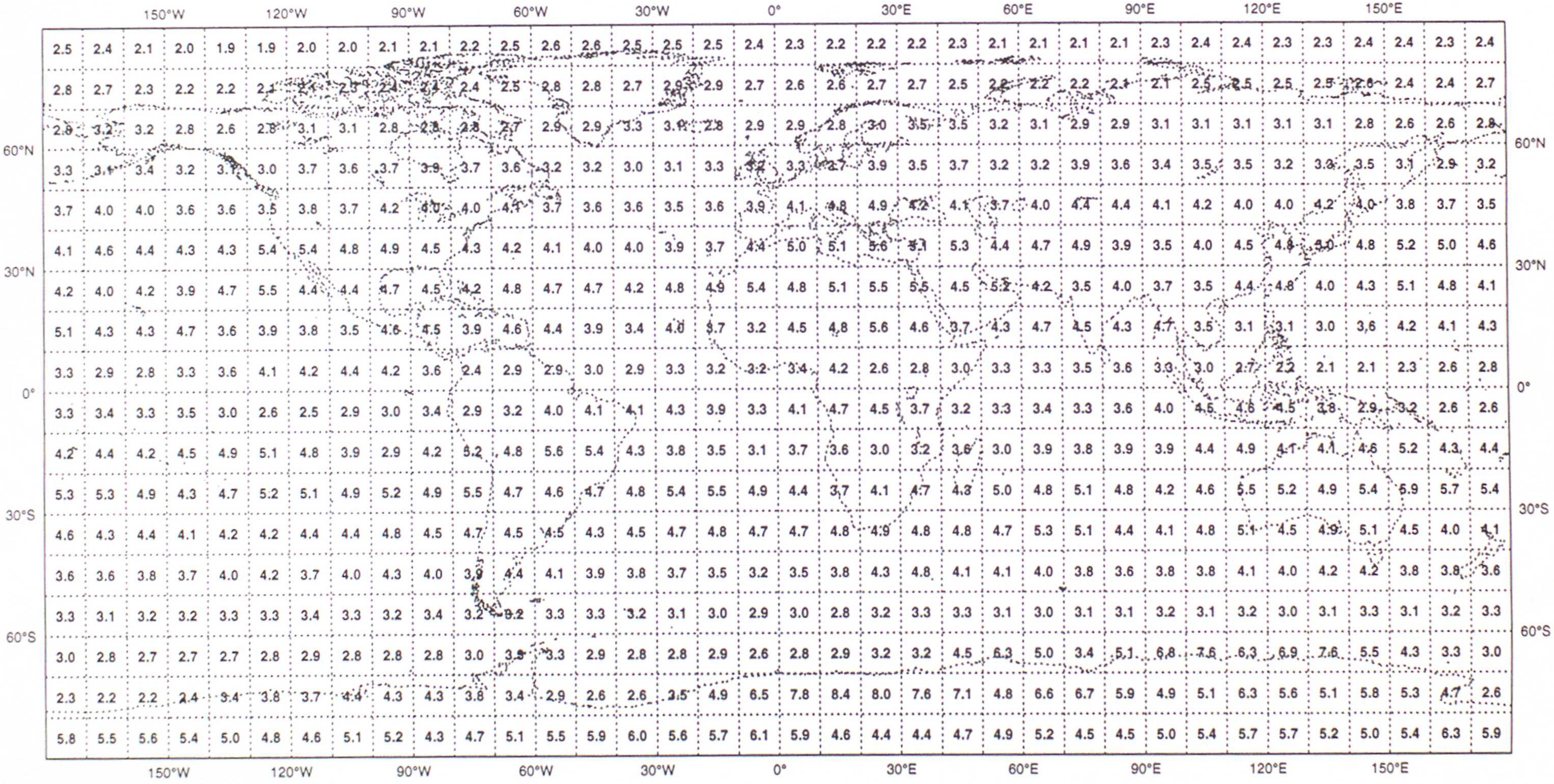
2.2	2.2	2.2	2.1	2.0	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.3	2.2	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2
2.4	2.3	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.3	2.5	2.6	2.8	2.8	2.6	2.5	2.5	2.6	2.6	2.5	2.4	2.8	2.2	2.1	2.2	2.3	2.4	2.5	2.5	2.4	2.3	2.2	2.3	2.4
2.5	2.7	2.9	3.0	3.4	3.8	4.1	4.0	3.7	3.2	3.0	2.9	2.7	2.8	3.3	3.0	3.0	3.0	2.9	3.2	3.3	3.5	3.6	3.5	3.4	3.3	3.4	3.5	3.5	3.5	3.3	3.1	3.0	2.7	2.4	2.7
2.9	2.9	3.0	2.8	3.1	3.9	4.4	4.0	3.9	4.2	4.2	4.2	3.0	2.9	3.0	3.0	3.2	3.2	3.3	2.8	3.6	3.8	3.6	3.4	3.6	3.6	3.5	4.0	4.0	4.3	4.0	3.9	3.4	2.9	3.1	2.8
3.2	3.4	3.3	3.0	3.2	4.2	4.8	4.5	3.8	3.5	3.3	3.3	3.6	3.7	3.4	3.5	3.3	3.4	3.8	3.6	3.4	3.6	3.5	3.7	3.9	4.0	4.2	4.2	4.3	3.8	3.8	3.8	3.8	3.7	3.9	3.4
3.6	3.6	3.4	3.1	3.3	3.9	4.4	4.6	4.0	3.7	3.6	3.5	3.6	3.3	3.3	3.5	3.2	3.7	4.1	3.4	3.6	3.5	4.2	4.0	4.3	5.3	4.7	3.7	3.5	3.4	3.4	3.6	3.8	3.7	3.3	3.4
3.5	3.3	3.6	3.3	3.3	3.2	3.4	3.8	3.5	3.6	3.3	3.5	3.5	3.3	3.4	3.5	3.7	4.2	4.0	3.8	4.3	3.6	4.1	4.0	3.7	3.9	4.6	4.0	3.6	3.5	3.6	3.3	3.3	3.5	3.1	3.4
3.4	3.2	3.4	3.2	3.4	3.1	3.3	3.4	3.4	3.4	3.2	3.4	3.3	3.3	3.4	3.4	3.6	4.0	3.6	3.8	4.0	3.5	3.6	3.4	3.4	3.5	3.3	3.2	3.2	3.3	3.4	3.3	3.3	3.4	3.2	3.4
3.3	3.2	3.3	3.2	3.2	3.2	3.3	3.3	3.2	3.2	3.2	3.4	3.2	3.2	3.3	3.3	3.2	3.5	3.2	3.5	3.5	3.2	3.3	3.4	3.3	3.4	3.4	3.3	3.3	3.3	3.3	3.3	3.3	3.4	3.4	3.2
3.5	3.3	3.2	3.3	3.3	3.2	3.3	3.1	3.2	3.1	3.2	3.4	3.2	3.2	3.3	3.3	3.3	3.3	3.1	3.5	3.1	3.2	3.3	3.4	3.2	3.3	3.4	3.2	3.4	3.2	3.3	3.3	3.2	3.3	3.5	3.2
3.5	3.3	3.2	3.5	3.4	3.4	3.3	3.3	3.5	3.2	3.5	3.9	3.3	3.3	3.3	3.3	3.4	3.3	3.1	3.4	2.9	3.3	3.3	3.5	3.3	3.3	3.4	3.1	3.5	3.4	3.3	3.4	3.3	3.3	3.5	3.1
3.9	3.9	3.6	3.7	3.7	3.8	3.6	3.6	3.8	3.5	3.7	4.2	3.8	3.5	3.5	3.6	3.8	3.3	3.4	3.4	3.4	3.9	3.6	4.0	3.6	3.6	3.8	3.7	3.9	3.6	3.5	3.7	3.8	3.8	3.6	3.6
3.8	3.8	3.6	3.6	3.8	3.8	3.6	3.6	3.8	4.0	4.5	4.0	3.6	3.8	3.4	3.8	4.3	3.9	3.8	3.4	3.7	4.1	3.7	3.8	3.8	3.8	3.7	3.7	3.7	3.4	3.2	3.5	3.4	3.5	3.8	3.8
3.7	3.8	3.6	3.4	3.5	3.5	3.4	3.4	3.5	3.6	3.8	3.8	3.6	3.9	3.6	4.0	4.2	4.3	3.9	3.8	4.0	4.0	3.9	3.9	4.2	4.2	3.8	3.8	3.6	3.6	3.4	3.5	3.5	3.4	3.7	3.7
3.4	3.6	3.6	3.5	3.2	3.3	3.6	3.5	3.2	3.3	3.5	3.6	3.4	3.9	4.0	3.6	3.6	4.0	3.6	3.8	3.5	3.6	4.1	3.8	3.8	4.0	3.9	3.6	3.5	3.8	4.0	3.6	3.8	3.8	3.6	3.6
3.7	3.8	3.6	3.5	3.3	3.3	3.5	3.6	3.7	3.7	3.7	4.0	3.9	4.1	4.1	4.0	4.0	4.1	4.1	4.0	3.9	4.0	5.0	5.8	5.0	4.3	5.1	5.7	5.8	5.5	5.9	6.2	5.2	4.4	4.2	4.0
3.0	3.2	3.4	3.4	3.8	4.0	4.0	4.3	4.4	4.4	3.9	3.3	3.3	3.1	3.2	3.4	3.9	4.5	5.0	5.3	5.3	4.5	3.7	2.6	3.6	3.7	2.9	2.0	2.2	2.8	2.8	2.4	2.8	2.9	3.2	2.9
4.6	4.6	4.8	4.6	4.4	4.2	3.9	4.0	3.9	3.3	3.7	4.0	4.2	4.2	4.2	3.8	3.4	3.1	2.7	2.1	1.7	1.4	1.4	1.6	1.9	1.8	1.6	1.2	1.9	2.3	2.4	2.4	2.7	3.4	4.4	4.5

Figure 30. ATOVS MEAN O-B brightness temperature differences (deg C). MAY 2003
Channel: HIRS11 (500 - 700 hPa)
NOAA15, using all observations



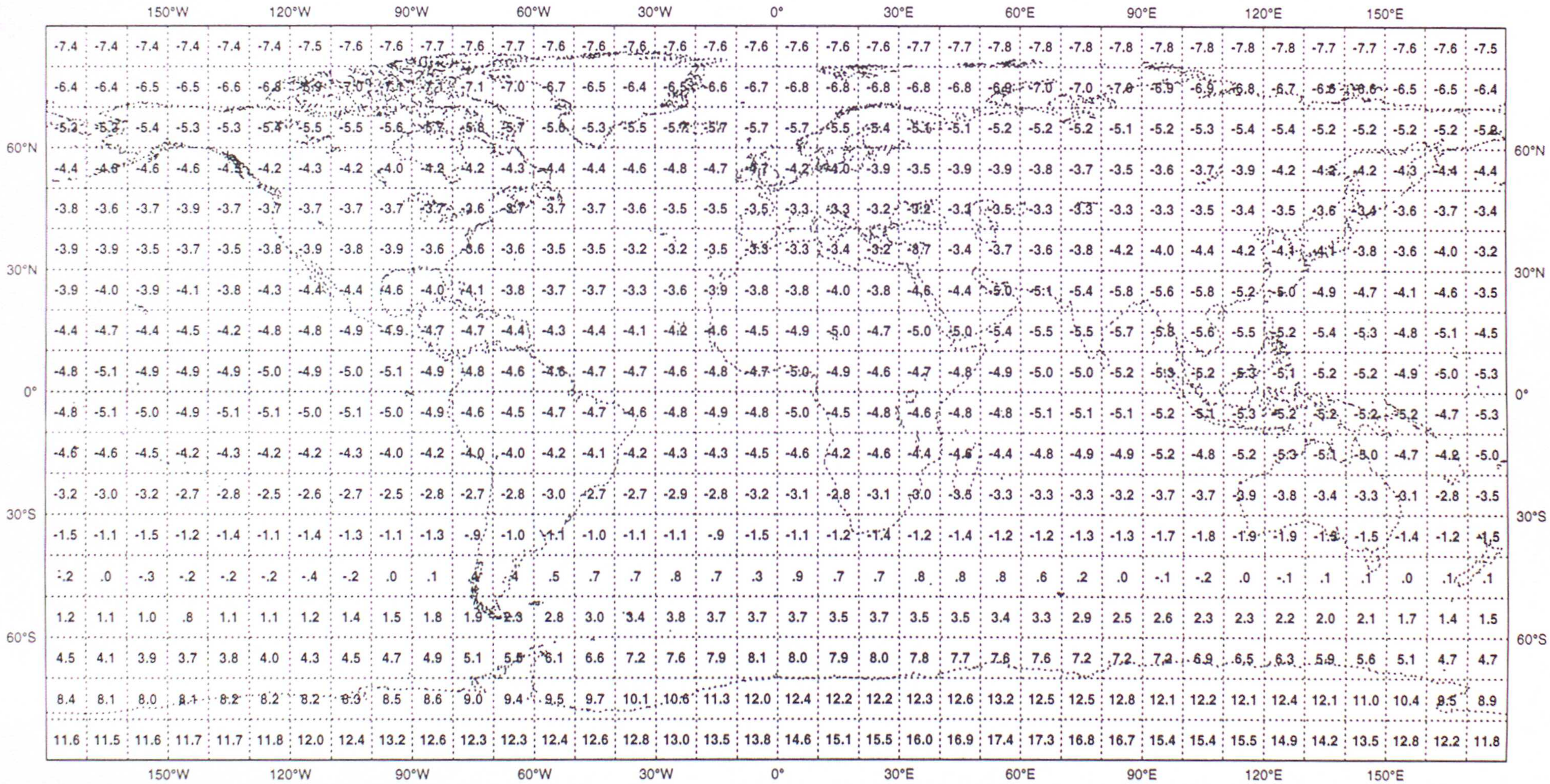
3.2	3.2	3.5	3.8	4.0	4.0	4.0	4.0	4.0	4.1	4.4	3.8	3.9	4.1	4.0	3.4	2.9	2.9	2.9	3.0	3.2	3.2	3.3	3.5	3.7	3.7	3.7	3.6	3.5	3.5	3.6	3.4	3.3	3.2	3.2	3.2
2.2	2.3	2.8	3.1	2.9	2.8	3.1	3.2	3.2	3.2	3.1	3.2	3.9	5.6	5.4	3.1	2.0	1.7	1.3	1.1	1.3	1.7	1.9	2.8	2.4	2.4	2.5	2.8	2.9	2.8	2.8	2.7	2.5	2.5	2.4	2.3
2.0	1.0	1.1	1.6	2.0	2.0	1.5	1.8	2.1	1.8	2.0	2.1	1.8	3.1	2.2	1.6	1.5	1.0	.6	.7	.3	.4	.1	.1	.5	1.1	1.6	2.0	2.2	2.2	2.1	2.6	2.6	2.3	2.8	2.6
.2	.8	-.2	.3	.4	1.1	.3	-1.2	-1.4	-1.4	-.1	.0	-.1	.0	-.2	-.4	-.1	-.2	-.2	-.9	-1.7	-1.0	-1.9	-1.1	-.6	-1.7	-.8	-.4	-.1	.5	.8	1.2	1.0	1.0	.8	.2
-1.0	-.9	-1.6	-1.5	-.7	-.6	-1.2	-1.7	-2.9	-2.5	-1.7	-2.0	-1.7	-1.7	-1.2	-1.6	-2.1	-2.6	-2.3	-4.1	-4.2	-4.6	-3.2	-2.2	-2.0	-2.6	-2.7	-1.9	-2.1	-2.2	-2.6	-2.2	-1.5	-1.0	-1.0	-.4
-4.9	-5.6	-3.5	-4.1	-4.3	-6.0	-6.6	-5.9	-6.4	-4.4	-3.4	-3.6	-2.8	-3.4	-4.4	-6.2	-7.5	-6.6	-6.5	-7.3	-8.2	-8.5	-6.8	-6.3	-6.4	-3.8	-3.3	-2.9	-3.8	-4.4	-5.1	-4.6	-3.8	-3.5	-4.2	-4.1
-9.3	-8.6	-8.5	-8.9	-7.9	-7.8	-8.8	-8.2	-9.6	-8.3	-5.9	-6.2	-7.7	-7.7	-8.2	-9.5	-9.8	-8.8	-8.3	-9.7	-10.7	-9.8	-7.1	-11.1	-12.6	-12.2	-9.9	-6.8	-6.6	-5.7	-5.7	-4.4	-5.2	-6.1	-9.1	-8.5
-7.2	-7.0	-8.1	-7.6	-4.6	-7.1	-8.1	-8.3	-8.4	-7.8	-7.1	-7.2	-7.3	-7.3	-6.9	-6.7	-7.7	-8.5	-11.1	-13.2	-10.6	-7.4	-9.7	-13.2	-13.6	-11.5	-10.5	-9.0	-7.5	-6.9	-6.9	-6.9	-7.5	-7.3	-8.9	-7.0
-5.0	-5.1	-5.5	-6.1	-7.2	-7.7	-7.4	-7.3	-7.0	-6.0	-3.8	-3.8	-4.0	-4.8	-5.1	-5.2	-5.9	-6.6	-6.3	-6.8	-3.6	-4.2	-5.6	-5.9	-5.2	-5.5	-7.0	-6.2	-5.4	-5.4	-4.7	-3.9	-3.9	-3.6	-4.4	-5.1
-6.5	-7.4	-8.2	-9.6	-11.8	-12.9	-13.2	-13.1	-12.2	-9.8	-5.1	-4.2	-6.3	-7.8	-7.8	-9.4	-10.9	-11.0	-9.7	-7.2	-6.6	-5.8	-5.8	-6.5	-6.7	-6.7	-7.3	-7.6	-8.0	-8.7	-8.6	-7.0	-5.6	-5.2	-4.5	-5.3
-8.0	-8.2	-7.7	-8.8	-9.4	-10.6	-12.1	-13.9	-13.4	-12.2	-9.2	-8.3	-9.3	-9.6	-9.5	-11.3	-13.7	-15.2	-15.6	-14.0	-13.6	-12.0	-10.1	-7.9	-9.0	-9.7	-9.7	-9.7	-11.3	-11.6	-12.5	-12.8	-10.4	-8.7	-6.1	-7.3
-6.0	-6.4	-5.0	-4.0	-5.8	-6.2	-7.4	-7.7	-8.2	-10.1	-11.3	-9.1	-9.9	-9.2	-8.7	-8.0	-7.8	-10.6	-13.1	-11.4	-9.6	-10.9	-10.9	-7.9	-9.1	-11.1	-10.8	-10.5	-9.5	-10.3	-10.6	-9.5	-8.8	-7.8	-6.2	-5.9
-4.4	-3.7	-4.3	-3.4	-3.2	-2.8	-3.0	-3.4	-4.1	-4.6	-4.8	-5.2	-4.4	-2.8	-3.7	-4.0	-3.6	-4.7	-4.7	-6.0	-5.7	-5.7	-5.9	-6.5	-7.6	-6.7	-4.7	-4.1	-4.7	-5.5	-6.2	-5.7	-4.6	-4.0	-4.1	-4.4
-1.1	-.7	-.9	-.7	-.8	-1.0	-1.0	-1.1	-1.4	-1.5	-.8	-1.2	-.9	-.7	-.9	-.2	.5	.4	1.0	-.3	-1.0	-1.4	-1.2	-1.3	-1.0	-.7	-.4	-.5	-.6	-.5	-.7	-1.2	-1.2	-1.5	-1.5	-1.2
1.7	1.6	1.5	.9	1.4	1.0	.6	.8	.7	.8	1.3	1.5	1.6	1.5	2.1	2.8	2.7	3.1	3.3	2.7	2.5	2.2	2.4	2.3	2.4	2.7	2.2	2.3	1.9	2.1	2.0	1.8	2.0	1.9	1.5	1.8
4.7	4.8	4.6	3.8	3.5	3.3	2.9	2.9	2.9	2.9	2.9	3.7	4.0	4.5	5.3	5.6	5.7	5.8	5.0	4.8	5.0	5.0	6.4	8.1	7.7	6.6	7.7	9.0	9.3	7.6	7.9	8.9	7.4	6.5	5.8	5.4
7.8	7.2	7.0	7.3	7.9	8.0	7.6	7.3	8.7	8.7	8.4	9.3	8.2	7.9	7.8	9.0	11.5	15.6	17.8	18.0	17.2	20.0	25.6	29.4	22.5	22.0	26.4	29.1	32.1	29.6	28.5	28.5	24.7	20.4	12.2	8.6
11.1	10.4	9.9	10.5	11.3	12.3	13.9	16.2	18.4	16.3	13.6	12.7	13.3	14.0	15.5	17.9	21.2	24.6	27.4	29.3	31.7	34.1	35.2	36.9	35.7	31.1	32.7	35.5	34.5	32.6	29.5	27.3	23.2	19.3	14.3	12.1

Figure 31. ATOVS SD O-B brightness temperature differences (deg C). MAY 2003
Channel: HIRS11 (500 - 700 hPa)
NOAA15, using all observations



2.5	2.4	2.1	2.0	1.9	1.9	2.0	2.0	2.1	2.1	2.2	2.5	2.6	2.6	2.5	2.5	2.5	2.4	2.3	2.2	2.2	2.2	2.3	2.1	2.1	2.1	2.1	2.3	2.4	2.4	2.3	2.3	2.4	2.4	2.3	2.4
2.8	2.7	2.3	2.2	2.2	2.1	2.4	2.3	2.4	2.4	2.4	2.5	2.8	2.8	2.7	2.9	2.9	2.7	2.6	2.6	2.7	2.7	2.5	2.2	2.2	2.2	2.1	2.1	2.5	2.5	2.5	2.5	2.6	2.4	2.4	2.7
2.9	3.2	3.2	2.8	2.6	2.8	3.1	3.1	2.8	2.8	2.8	2.7	2.9	2.9	3.3	3.1	2.8	2.9	2.9	2.8	3.0	3.5	3.5	3.2	3.1	2.9	2.9	3.1	3.1	3.1	3.1	3.1	2.8	2.6	2.6	2.8
3.3	3.1	3.4	3.2	3.1	3.0	3.7	3.6	3.7	3.9	3.7	3.6	3.2	3.2	3.0	3.1	3.3	3.2	3.3	2.7	3.9	3.5	3.7	3.2	3.2	3.9	3.6	3.4	3.5	3.5	3.2	3.3	3.5	3.1	2.9	3.2
3.7	4.0	4.0	3.6	3.6	3.5	3.8	3.7	4.2	4.0	4.0	4.1	3.7	3.6	3.6	3.5	3.6	3.9	4.1	4.8	4.9	4.2	4.1	3.7	4.0	4.4	4.4	4.1	4.2	4.0	4.0	4.2	4.0	3.8	3.7	3.5
4.1	4.6	4.4	4.3	4.3	5.4	5.4	4.8	4.9	4.5	4.3	4.2	4.1	4.0	4.0	3.9	3.7	4.4	5.0	5.1	5.6	5.1	5.3	4.4	4.7	4.9	3.9	3.5	4.0	4.5	4.8	5.0	4.8	5.2	5.0	4.6
4.2	4.0	4.2	3.9	4.7	5.5	4.4	4.4	4.7	4.5	4.2	4.8	4.7	4.7	4.2	4.8	4.9	5.4	4.8	5.1	5.5	5.5	4.5	5.2	4.2	3.5	4.0	3.7	3.5	4.4	4.8	4.0	4.3	5.1	4.8	4.1
5.1	4.3	4.3	4.7	3.6	3.9	3.8	3.5	4.6	4.5	3.9	4.6	4.4	3.9	3.4	4.0	3.7	3.2	4.5	4.8	5.6	4.6	3.7	4.3	4.7	4.5	4.3	4.7	3.5	3.1	3.1	3.0	3.6	4.2	4.1	4.3
3.3	2.9	2.8	3.3	3.6	4.1	4.2	4.4	4.2	3.6	2.4	2.9	2.9	3.0	2.9	3.3	3.2	3.2	3.4	4.2	2.6	2.8	3.0	3.3	3.3	3.5	3.6	3.3	3.0	2.7	2.2	2.1	2.1	2.3	2.6	2.8
3.3	3.4	3.3	3.5	3.0	2.6	2.5	2.9	3.0	3.4	2.9	3.2	4.0	4.1	4.1	4.3	3.9	3.3	4.1	4.7	4.5	3.7	3.2	3.3	3.4	3.3	3.6	4.0	4.5	4.6	4.5	3.8	2.9	3.2	2.6	2.6
4.2	4.4	4.2	4.5	4.9	5.1	4.8	3.9	2.9	4.2	5.2	4.8	5.6	5.4	4.3	3.8	3.5	3.1	3.7	3.6	3.0	3.2	3.6	3.0	3.9	3.8	3.9	3.9	4.4	4.9	4.1	4.1	4.6	5.2	4.3	4.4
5.3	5.3	4.9	4.3	4.7	5.2	5.1	4.9	5.2	4.9	5.5	4.7	4.6	4.7	4.8	5.4	5.5	4.9	4.4	3.7	4.1	4.7	4.3	5.0	4.8	5.1	4.8	4.2	4.6	5.5	5.2	4.9	5.4	5.9	5.7	5.4
4.6	4.3	4.4	4.1	4.2	4.2	4.4	4.4	4.8	4.5	4.7	4.5	4.5	4.3	4.5	4.7	4.8	4.7	4.7	4.8	4.9	4.8	4.8	4.7	5.3	5.1	4.4	4.1	4.8	5.1	4.5	4.9	5.1	4.5	4.0	4.1
3.6	3.6	3.8	3.7	4.0	4.2	3.7	4.0	4.3	4.0	3.9	4.4	4.1	3.9	3.8	3.7	3.5	3.2	3.5	3.8	4.3	4.8	4.1	4.1	4.0	3.8	3.6	3.8	3.8	4.1	4.0	4.2	4.2	3.8	3.8	3.6
3.3	3.1	3.2	3.2	3.3	3.3	3.4	3.3	3.2	3.4	3.2	3.2	3.3	3.3	3.2	3.1	3.0	2.9	3.0	2.8	3.2	3.3	3.3	3.1	3.0	3.1	3.1	3.2	3.1	3.2	3.0	3.1	3.3	3.1	3.2	3.3
3.0	2.8	2.7	2.7	2.7	2.8	2.9	2.8	2.8	2.8	3.0	3.3	3.3	2.9	2.8	2.8	2.9	2.6	2.8	2.9	3.2	3.2	4.5	6.3	5.0	3.4	5.1	6.8	7.6	6.3	6.9	7.6	5.5	4.3	3.3	3.0
2.3	2.2	2.2	2.4	3.4	3.8	3.7	4.4	4.3	4.3	3.8	3.4	2.9	2.6	2.6	3.5	4.9	6.5	7.8	8.4	8.0	7.6	7.1	4.8	6.6	6.7	5.9	4.9	5.1	6.3	5.6	5.1	5.8	5.3	4.7	2.6
5.8	5.5	5.6	5.4	5.0	4.8	4.6	5.1	5.2	4.3	4.7	5.1	5.5	5.9	6.0	5.6	5.7	6.1	5.9	4.6	4.4	4.4	4.7	4.9	5.2	4.5	4.5	5.0	5.4	5.7	5.7	5.2	5.0	5.4	6.3	5.9

Figure 32. ATOVS MEAN O-B brightness temperature differences (deg C). MAY 2003
Channel: HIRS4 (400 hPa)
NOAA15, using all observations



-7.4	-7.4	-7.4	-7.4	-7.4	-7.4	-7.5	-7.6	-7.6	-7.7	-7.6	-7.7	-7.6	-7.6	-7.6	-7.6	-7.6	-7.6	-7.6	-7.6	-7.6	-7.7	-7.7	-7.8	-7.8	-7.8	-7.8	-7.8	-7.8	-7.8	-7.8	-7.7	-7.7	-7.6	-7.6	-7.5
-6.4	-6.4	-6.5	-6.5	-6.6	-6.8	-6.9	-7.0	-7.1	-7.1	-7.1	-7.0	-6.7	-6.5	-6.4	-6.5	-6.6	-6.7	-6.8	-6.8	-6.8	-6.8	-6.8	-6.9	-7.0	-7.0	-7.0	-6.9	-6.9	-6.8	-6.7	-6.5	-6.6	-6.5	-6.5	-6.4
-5.3	-5.2	-5.4	-5.3	-5.3	-5.4	-5.5	-5.5	-5.6	-5.7	-5.8	-5.7	-5.6	-5.3	-5.5	-5.7	-5.7	-5.7	-5.7	-5.5	-5.4	-5.1	-5.1	-5.2	-5.2	-5.2	-5.1	-5.2	-5.3	-5.4	-5.4	-5.2	-5.2	-5.2	-5.2	-5.2
-4.4	-4.6	-4.6	-4.6	-4.5	-4.2	-4.3	-4.2	-4.0	-4.2	-4.2	-4.3	-4.4	-4.4	-4.6	-4.8	-4.7	-4.7	-4.2	-4.0	-3.9	-3.5	-3.9	-3.9	-3.8	-3.7	-3.5	-3.6	-3.7	-3.9	-4.2	-4.2	-4.2	-4.3	-4.4	-4.4
-3.8	-3.6	-3.7	-3.9	-3.7	-3.7	-3.7	-3.7	-3.7	-3.7	-3.6	-3.7	-3.7	-3.7	-3.6	-3.5	-3.5	-3.5	-3.3	-3.3	-3.2	-3.2	-3.1	-3.5	-3.3	-3.3	-3.3	-3.3	-3.5	-3.4	-3.5	-3.6	-3.4	-3.6	-3.7	-3.4
-3.9	-3.9	-3.5	-3.7	-3.5	-3.8	-3.9	-3.8	-3.9	-3.6	-3.6	-3.6	-3.5	-3.5	-3.2	-3.2	-3.5	-3.3	-3.3	-3.4	-3.2	-3.7	-3.4	-3.7	-3.6	-3.8	-4.2	-4.0	-4.4	-4.2	-4.1	-4.1	-3.8	-3.6	-4.0	-3.2
-3.9	-4.0	-3.9	-4.1	-3.8	-4.3	-4.4	-4.4	-4.6	-4.0	-4.1	-3.8	-3.7	-3.7	-3.3	-3.6	-3.9	-3.8	-3.8	-4.0	-3.8	-4.6	-4.4	-5.0	-5.1	-5.4	-5.8	-5.6	-5.8	-5.2	-5.0	-4.9	-4.7	-4.1	-4.6	-3.5
-4.4	-4.7	-4.4	-4.5	-4.2	-4.8	-4.8	-4.9	-4.9	-4.7	-4.7	-4.4	-4.3	-4.4	-4.1	-4.2	-4.6	-4.5	-4.9	-5.0	-4.7	-5.0	-5.0	-5.4	-5.5	-5.5	-5.7	-5.8	-5.6	-5.5	-5.2	-5.4	-5.3	-4.8	-5.1	-4.5
-4.8	-5.1	-4.9	-4.9	-4.9	-5.0	-4.9	-5.0	-5.1	-4.9	-4.8	-4.6	-4.6	-4.7	-4.7	-4.6	-4.8	-4.7	-5.0	-4.9	-4.6	-4.7	-4.8	-4.9	-5.0	-5.0	-5.2	-5.3	-5.2	-5.3	-5.1	-5.2	-5.2	-4.9	-5.0	-5.3
-4.8	-5.1	-5.0	-4.9	-5.1	-5.1	-5.0	-5.1	-5.0	-4.9	-4.6	-4.5	-4.7	-4.7	-4.6	-4.8	-4.9	-4.8	-5.0	-4.5	-4.8	-4.6	-4.8	-4.8	-5.1	-5.1	-5.1	-5.2	-5.1	-5.3	-5.2	-5.2	-5.2	-5.2	-4.7	-5.3
-4.6	-4.6	-4.5	-4.2	-4.3	-4.2	-4.2	-4.3	-4.0	-4.2	-4.0	-4.0	-4.2	-4.1	-4.2	-4.3	-4.3	-4.5	-4.6	-4.2	-4.6	-4.4	-4.6	-4.4	-4.8	-4.9	-4.9	-5.2	-4.8	-5.2	-5.3	-5.1	-5.0	-4.7	-4.2	-5.0
-3.2	-3.0	-3.2	-2.7	-2.8	-2.5	-2.6	-2.7	-2.5	-2.8	-2.7	-2.8	-3.0	-2.7	-2.7	-2.9	-2.8	-3.2	-3.1	-2.8	-3.1	-3.0	-3.5	-3.3	-3.3	-3.3	-3.2	-3.7	-3.7	-3.9	-3.8	-3.4	-3.3	-3.1	-2.8	-3.5
-1.5	-1.1	-1.5	-1.2	-1.4	-1.1	-1.4	-1.3	-1.1	-1.3	-.9	-1.0	-1.1	-1.0	-1.1	-1.1	-.9	-1.5	-1.1	-1.2	-1.4	-1.2	-1.4	-1.2	-1.2	-1.3	-1.3	-1.7	-1.8	-1.9	-1.9	-1.5	-1.5	-1.4	-1.2	-1.5
-.2	.0	-.3	-.2	-.2	-.2	-.4	-.2	.0	.1	.4	.4	.5	.7	.7	.8	.7	.3	.9	.7	.7	.8	.8	.8	.6	.2	.0	-.1	-.2	.0	-.1	.1	.1	.0	.1	.1
1.2	1.1	1.0	.8	1.1	1.1	1.2	1.4	1.5	1.8	1.9	2.3	2.8	3.0	3.4	3.8	3.7	3.7	3.7	3.5	3.7	3.5	3.5	3.4	3.3	2.9	2.5	2.6	2.3	2.3	2.2	2.0	2.1	1.7	1.4	1.5
4.5	4.1	3.9	3.7	3.8	4.0	4.3	4.5	4.7	4.9	5.1	5.5	6.1	6.6	7.2	7.6	7.9	8.1	8.0	7.9	8.0	7.8	7.7	7.6	7.6	7.2	7.2	7.2	6.9	6.5	6.3	5.9	5.6	5.1	4.7	4.7
8.4	8.1	8.0	8.1	8.2	8.2	8.2	8.3	8.5	8.6	9.0	9.4	9.5	9.7	10.1	10.6	11.3	12.0	12.4	12.2	12.2	12.3	12.6	13.2	12.5	12.5	12.8	12.1	12.2	12.1	12.4	12.1	11.0	10.4	9.5	8.9
11.6	11.5	11.6	11.7	11.7	11.8	12.0	12.4	13.2	12.6	12.3	12.3	12.4	12.6	12.8	13.0	13.5	13.8	14.6	15.1	15.5	16.0	16.9	17.4	17.3	16.8	16.7	15.4	15.4	15.5	14.9	14.2	13.5	12.8	12.2	11.8

Figure 33. ATOVS SD O-B brightness temperature differences (deg C). MAY 2003
Channel: HIRS4 (400 hPa)
NOAA15, using all observations

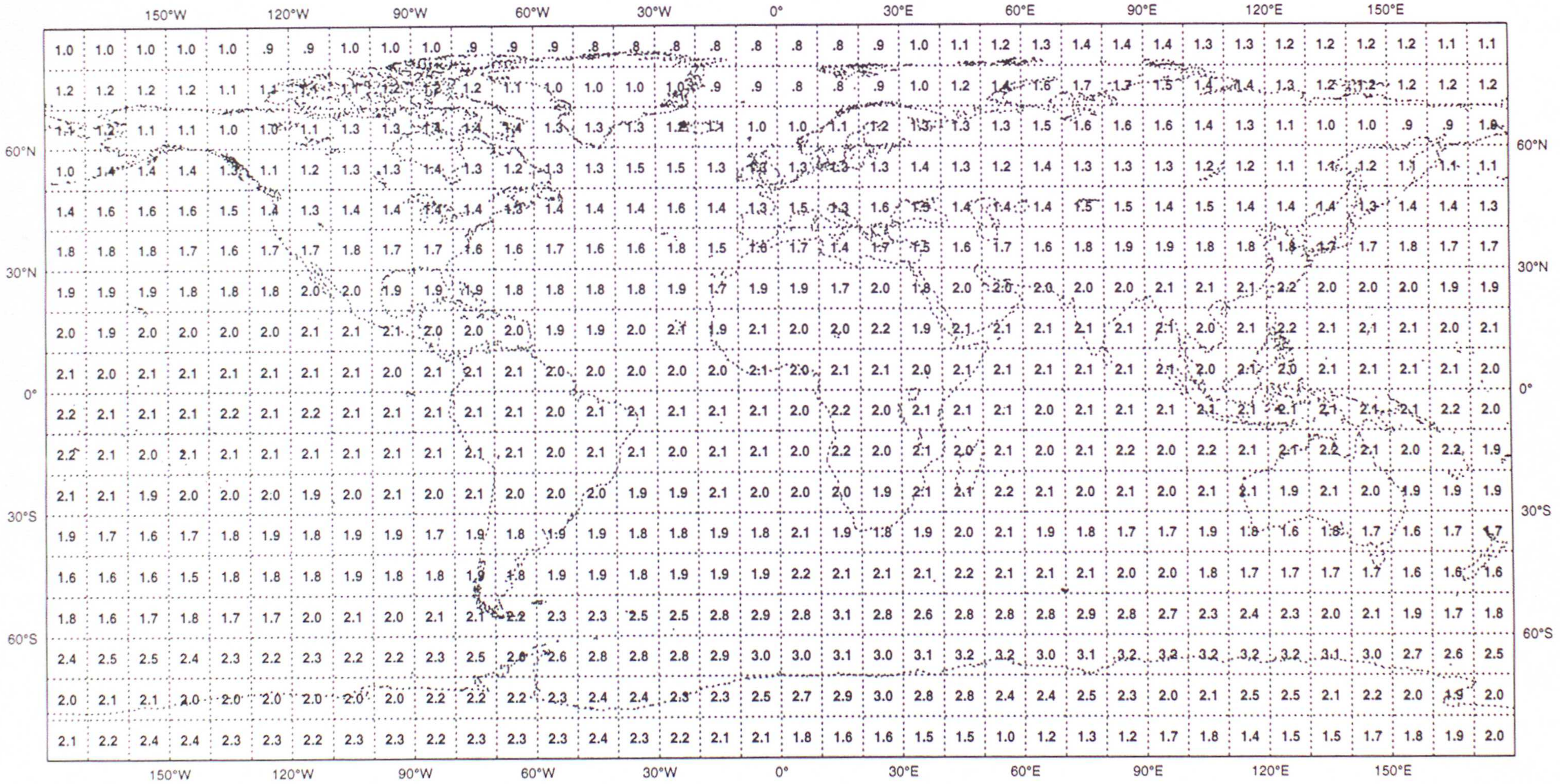

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
1.0 1.0 1.0 1.0 1.0 .9 .9 1.0 1.0 1.0 .9 .9 .9 .8 .8 .8 .8 .8 .8 .8 .9 1.0 1.1 1.2 1.3 1.4 1.4 1.4 1.3 1.3 1.2 1.2 1.2 1.2 1.1 1.1
1.2 1.2 1.2 1.2 1.1 1.1 1.1 1.1 1.2 1.2 1.2 1.1 1.0 1.0 1.0 1.0 .9 .9 .8 .8 .9 1.0 1.2 1.4 1.6 1.7 1.7 1.5 1.4 1.4 1.3 1.2 1.2 1.2 1.2 1.2
1.1 1.2 1.1 1.1 1.0 1.0 1.1 1.3 1.3 1.4 1.4 1.4 1.3 1.3 1.3 1.2 1.1 1.0 1.0 1.1 1.2 1.3 1.3 1.3 1.5 1.6 1.6 1.6 1.4 1.3 1.1 1.0 1.0 .9 .9 1.0
1.0 1.4 1.4 1.4 1.3 1.1 1.2 1.3 1.3 1.4 1.3 1.2 1.3 1.3 1.5 1.5 1.3 1.3 1.3 1.3 1.3 1.4 1.3 1.2 1.4 1.3 1.3 1.3 1.2 1.2 1.1 1.1 1.2 1.1 1.1 1.1
1.4 1.6 1.6 1.6 1.5 1.4 1.3 1.4 1.4 1.4 1.4 1.3 1.4 1.4 1.4 1.6 1.4 1.3 1.5 1.3 1.6 1.5 1.4 1.4 1.4 1.5 1.5 1.4 1.5 1.4 1.4 1.4 1.3 1.4 1.4 1.3
1.8 1.8 1.8 1.7 1.6 1.7 1.7 1.8 1.7 1.7 1.6 1.6 1.7 1.6 1.6 1.8 1.5 1.6 1.7 1.4 1.7 1.5 1.6 1.7 1.6 1.8 1.9 1.9 1.8 1.8 1.8 1.7 1.7 1.8 1.7 1.7
1.9 1.9 1.9 1.8 1.8 1.8 2.0 2.0 1.9 1.9 1.9 1.8 1.8 1.8 1.8 1.9 1.7 1.9 1.9 1.7 2.0 1.8 2.0 2.0 2.0 2.0 2.0 2.1 2.1 2.1 2.2 2.0 2.0 2.0 1.9 1.9
2.0 1.9 2.0 2.0 2.0 2.0 2.1 2.1 2.1 2.0 2.0 2.0 1.9 1.9 2.0 2.1 1.9 2.1 2.0 2.0 2.2 1.9 2.1 2.1 2.1 2.1 2.1 2.1 2.0 2.1 2.2 2.1 2.1 2.1 2.0 2.1
2.1 2.0 2.1 2.1 2.1 2.1 2.1 2.1 2.0 2.1 2.1 2.1 2.0 2.0 2.0 2.0 2.0 2.1 2.0 2.1 2.1 2.0 2.1 2.1 2.1 2.1 2.1 2.1 2.0 2.1 2.0 2.1 2.1 2.1 2.1 2.0
2.2 2.1 2.1 2.1 2.2 2.1 2.2 2.1 2.1 2.1 2.1 2.1 2.0 2.1 2.1 2.1 2.1 2.1 2.0 2.2 2.0 2.1 2.1 2.1 2.0 2.1 2.1 2.1 2.1 2.1 2.1 2.1 2.1 2.1 2.2 2.0
2.2 2.1 2.0 2.1 2.1 2.1 2.1 2.1 2.1 2.1 2.1 2.1 2.0 2.1 2.1 2.0 2.1 2.1 2.0 2.2 2.0 2.1 2.0 2.1 2.0 2.1 2.2 2.0 2.2 2.1 2.1 2.2 2.1 2.0 2.2 1.9
2.1 2.1 1.9 2.0 2.0 2.0 1.9 2.0 2.1 2.0 2.1 2.0 2.0 2.0 1.9 1.9 2.1 2.0 2.0 2.0 1.9 2.1 2.1 2.2 2.1 2.0 2.1 2.0 2.1 2.1 1.9 2.1 2.0 1.9 1.9 1.9
1.9 1.7 1.6 1.7 1.8 1.9 1.8 1.9 1.9 1.7 1.9 1.8 1.9 1.9 1.8 1.8 1.9 1.8 2.1 1.9 1.8 1.9 2.0 2.1 1.9 1.8 1.7 1.7 1.9 1.8 1.6 1.8 1.7 1.6 1.7 1.7
1.6 1.6 1.6 1.5 1.8 1.8 1.8 1.9 1.8 1.8 1.9 1.8 1.9 1.9 1.8 1.9 1.9 1.9 2.2 2.1 2.1 2.1 2.2 2.1 2.1 2.1 2.0 2.0 1.8 1.7 1.7 1.7 1.7 1.6 1.6 1.6
1.8 1.6 1.7 1.8 1.7 1.7 2.0 2.1 2.0 2.1 2.1 2.2 2.3 2.3 2.5 2.5 2.8 2.9 2.8 3.1 2.8 2.6 2.8 2.8 2.8 2.9 2.8 2.7 2.3 2.4 2.3 2.0 2.1 1.9 1.7 1.8
2.4 2.5 2.5 2.4 2.3 2.2 2.3 2.2 2.2 2.3 2.5 2.6 2.6 2.8 2.8 2.8 2.9 3.0 3.0 3.1 3.0 3.1 3.2 3.2 3.0 3.1 3.2 3.2 3.2 3.2 3.2 3.1 3.0 2.7 2.6 2.5
2.0 2.1 2.1 2.0 2.0 2.0 2.0 2.0 2.0 2.2 2.2 2.2 2.3 2.4 2.4 2.3 2.3 2.5 2.7 2.9 3.0 2.8 2.8 2.4 2.4 2.5 2.3 2.0 2.1 2.5 2.5 2.1 2.2 2.0 1.9 2.0
2.1 2.2 2.4 2.4 2.3 2.3 2.2 2.3 2.3 2.2 2.3 2.3 2.3 2.4 2.3 2.2 2.1 2.1 1.8 1.6 1.6 1.5 1.5 1.0 1.2 1.3 1.2 1.7 1.8 1.4 1.5 1.5 1.7 1.8 1.9 2.0

Figure 34. ATOVS MEAN O-B brightness temperature differences (deg C). MAY 2003
Channel: AMSUA-5 (700 hPa)
NOAA15, using all observations

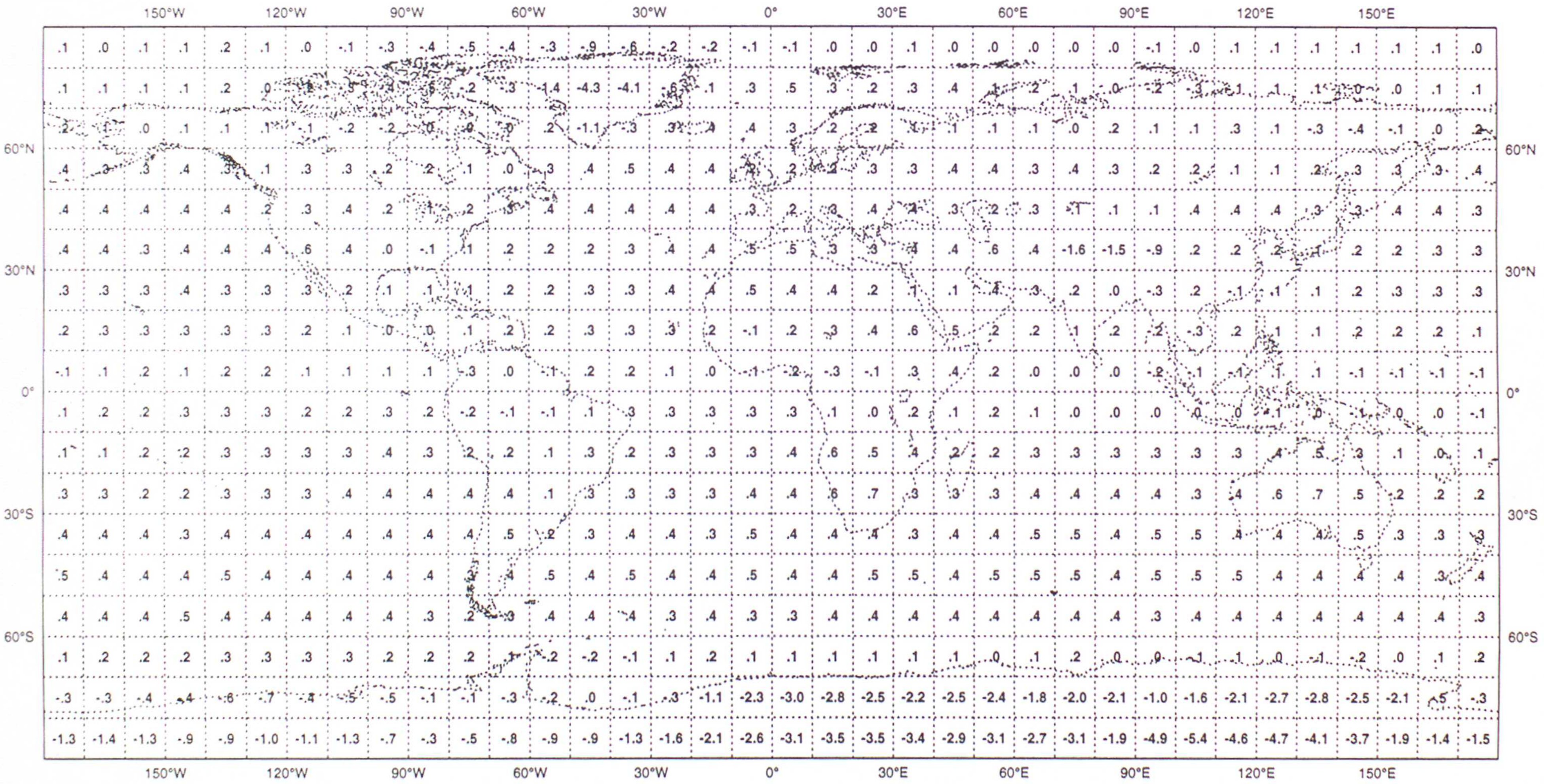

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
.1 .0 .1 .1 .2 .1 .0 -.1 -.3 -.4 -.5 -.4 -.3 -.9 -.6 -.2 -.2 -.1 -.1 .0 .0 .1 .0 .0 .0 .0 .0 -.1 .0 .1 .1 .1 .1 .1 .1 .0
.1 .1 .1 .1 .2 .0 .2 .3 .4 .5 -.2 -.3 -1.4 -4.3 -4.1 -.6 .1 .3 .5 .3 .2 .3 .4 .1 .2 .1 .0 -.2 -.3 .1 .1 .1 .0 .0 .1 .1
.2 .1 .0 .1 .1 .1 -.1 -.2 -.2 .0 .0 .0 .2 -1.1 -.3 .3 .4 .4 .3 .2 .2 .1 .1 .1 .1 .0 .2 .1 .1 .3 .1 -.3 -.4 -.1 .0 .2
.4 .3 .3 .4 .3 .1 .3 .3 .2 .2 .1 .0 .3 .4 .5 .4 .4 .2 .2 .2 .3 .3 .4 .4 .3 .4 .3 .2 .2 .1 .1 .2 .3 .3 .3 .4
.4 .4 .4 .4 .4 .2 .3 .4 .2 .1 .2 .3 .4 .4 .4 .4 .4 .3 .2 .3 .4 .4 .3 .2 .3 .1 .1 .1 .4 .4 .4 .3 .3 .4 .4 .3
.4 .4 .3 .4 .4 .4 .6 .4 .0 -.1 .1 .2 .2 .2 .3 .4 .4 .5 .5 .3 .3 .4 .4 .6 .4 -1.6 -1.5 -.9 .2 .2 .2 .1 .2 .2 .3 .3
.3 .3 .3 .4 .3 .3 .3 .2 .1 .1 .1 .2 .2 .3 .3 .4 .4 .5 .4 .4 .2 .1 .1 .4 .3 .2 .0 -.3 .2 -.1 .1 .1 .2 .3 .3 .3
.2 .3 .3 .3 .3 .3 .2 .1 .0 .0 .1 .2 .2 .3 .3 .3 .2 -.1 .2 .3 .4 .6 .5 .2 .2 .1 .2 .2 -.3 .2 .1 .1 .2 .2 .2 .1
-.1 .1 .2 .1 .2 .2 .1 .1 .1 .1 -.3 .0 -.1 .2 .2 .1 .0 -.1 -.2 -.3 -.1 .3 .4 .2 .0 .0 .0 -.2 -.1 -.1 .1 .1 -.1 -.1 -.1 -.1
.1 .2 .2 .3 .3 .3 .2 .2 .3 .2 -.2 -.1 -.1 .1 .3 .3 .3 .3 .3 .1 .0 .2 .1 .2 .1 .0 .0 .0 .0 .0 .1 .0 -.1 .0 .0 -.1
.1 .1 .2 .2 .3 .3 .3 .3 .4 .3 .2 .2 .1 .3 .2 .3 .3 .3 .4 .6 .5 .4 .2 .2 .3 .3 .3 .3 .3 .3 .4 .5 .3 .1 .0 .1
.3 .3 .2 .2 .3 .3 .3 .4 .4 .4 .4 .4 .1 .3 .3 .3 .3 .4 .4 .6 .7 .3 .3 .3 .4 .4 .4 .4 .3 .4 .6 .7 .5 .2 .2 .2
.4 .4 .4 .3 .4 .4 .4 .4 .4 .4 .4 .5 .2 .3 .4 .4 .3 .5 .4 .4 .4 .3 .4 .4 .5 .5 .4 .5 .5 .4 .4 .4 .5 .3 .3 .3
.5 .4 .4 .4 .5 .4 .4 .4 .4 .4 .3 .4 .5 .4 .5 .4 .4 .5 .4 .4 .5 .5 .4 .5 .5 .5 .4 .5 .5 .5 .4 .4 .4 .4 .3 .4
.4 .4 .4 .5 .4 .4 .4 .4 .4 .3 .2 .3 .4 .4 .4 .3 .4 .3 .3 .4 .4 .4 .4 .4 .4 .4 .4 .3 .4 .4 .4 .4 .4 .4 .4 .3
.1 .2 .2 .2 .3 .3 .3 .3 .2 .2 .2 .1 -.2 -.2 -.1 .1 .2 .1 .1 .1 .1 .1 .1 .0 .1 .2 .0 .0 -.1 -.1 .0 -.1 -.2 .0 .1 .2
-.3 -.3 -.4 -.4 -.6 -.7 -.4 -.5 -.5 -.1 -.1 -.3 -.2 .0 -.1 -.3 -1.1 -2.3 -3.0 -2.8 -2.5 -2.2 -2.5 -2.4 -1.8 -2.0 -2.1 -1.0 -1.6 -2.1 -2.7 -2.8 -2.5 -2.1 .5 -.3
-1.3 -1.4 -1.3 -.9 -.9 -1.0 -1.1 -1.3 -.7 -.3 -.5 -.8 -.9 -.9 -1.3 -1.6 -2.1 -2.6 -3.1 -3.5 -3.5 -3.4 -2.9 -3.1 -2.7 -3.1 -1.9 -4.9 -5.4 -4.6 -4.7 -4.1 -3.7 -1.9 -1.4 -1.5

Figure 35. ATOVS SD O-B brightness temperature differences (deg C). MAY 2003
Channel: AMSUA-5 (700 hPa)
NOAA15, using all observations

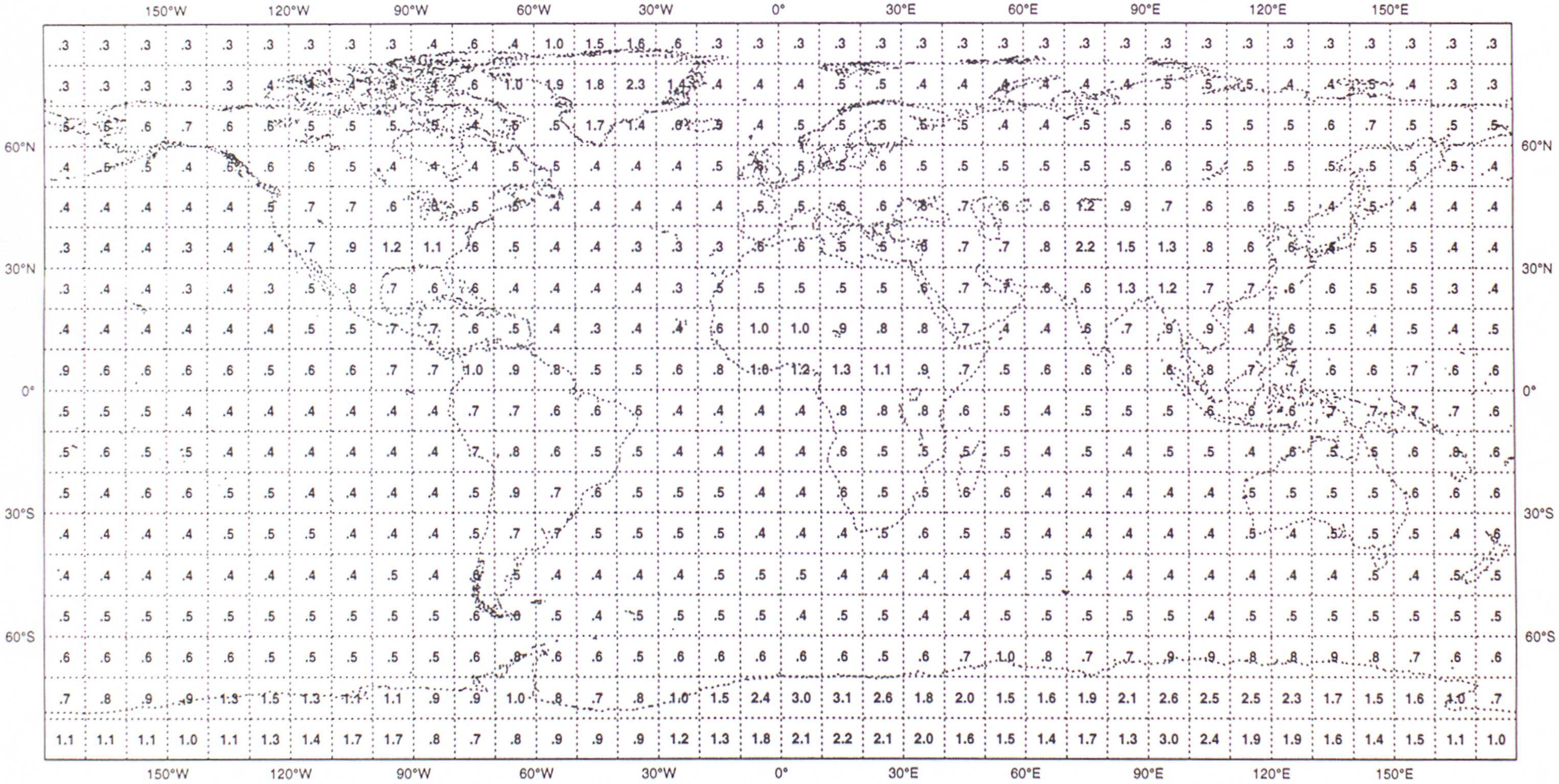

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 36. ATOVS MEAN O-B brightness temperature differences (deg C). MAY 2003
Channel: AMSUA-7 (300 hPa)
NOAA15, using all observations

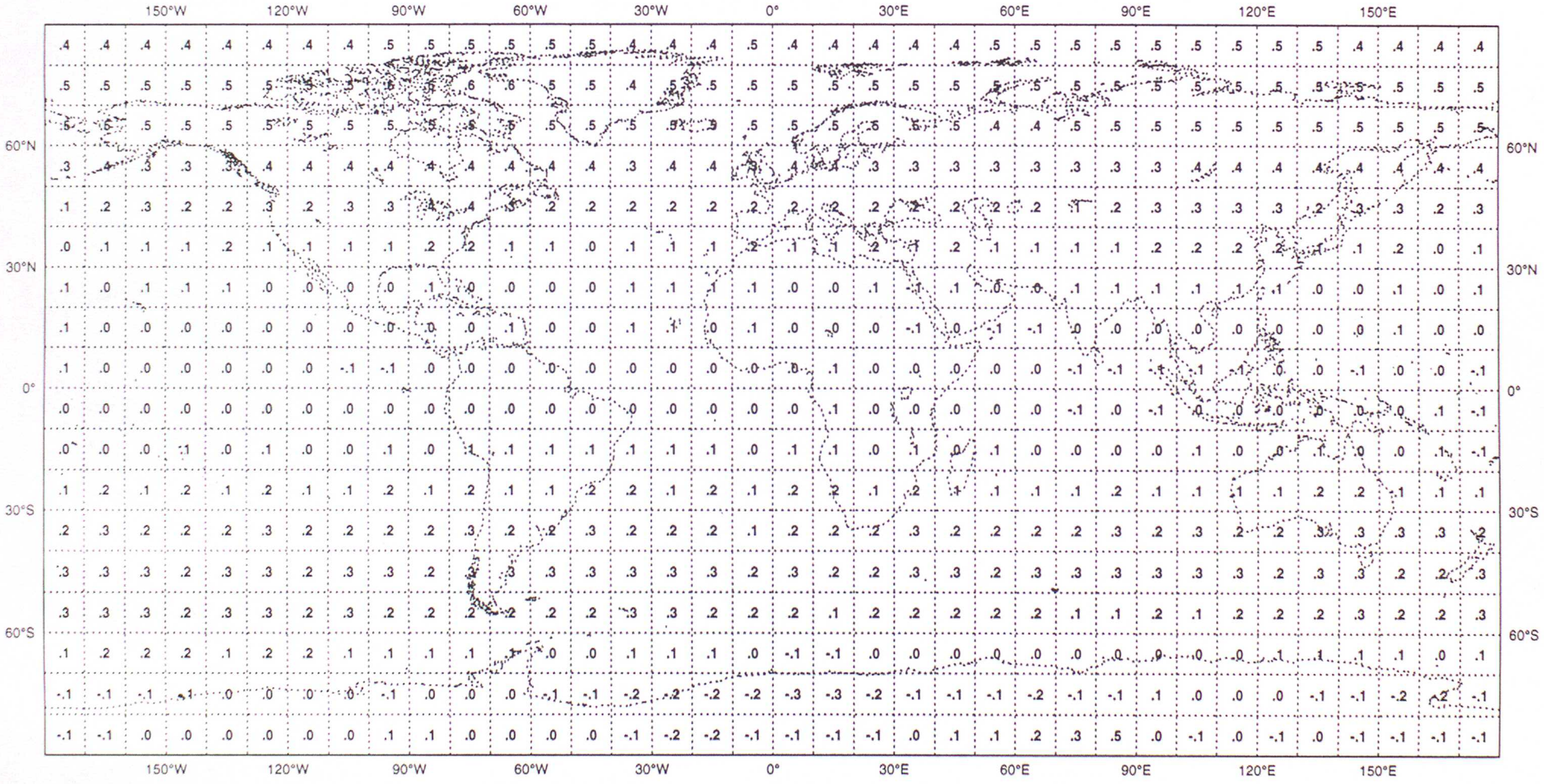
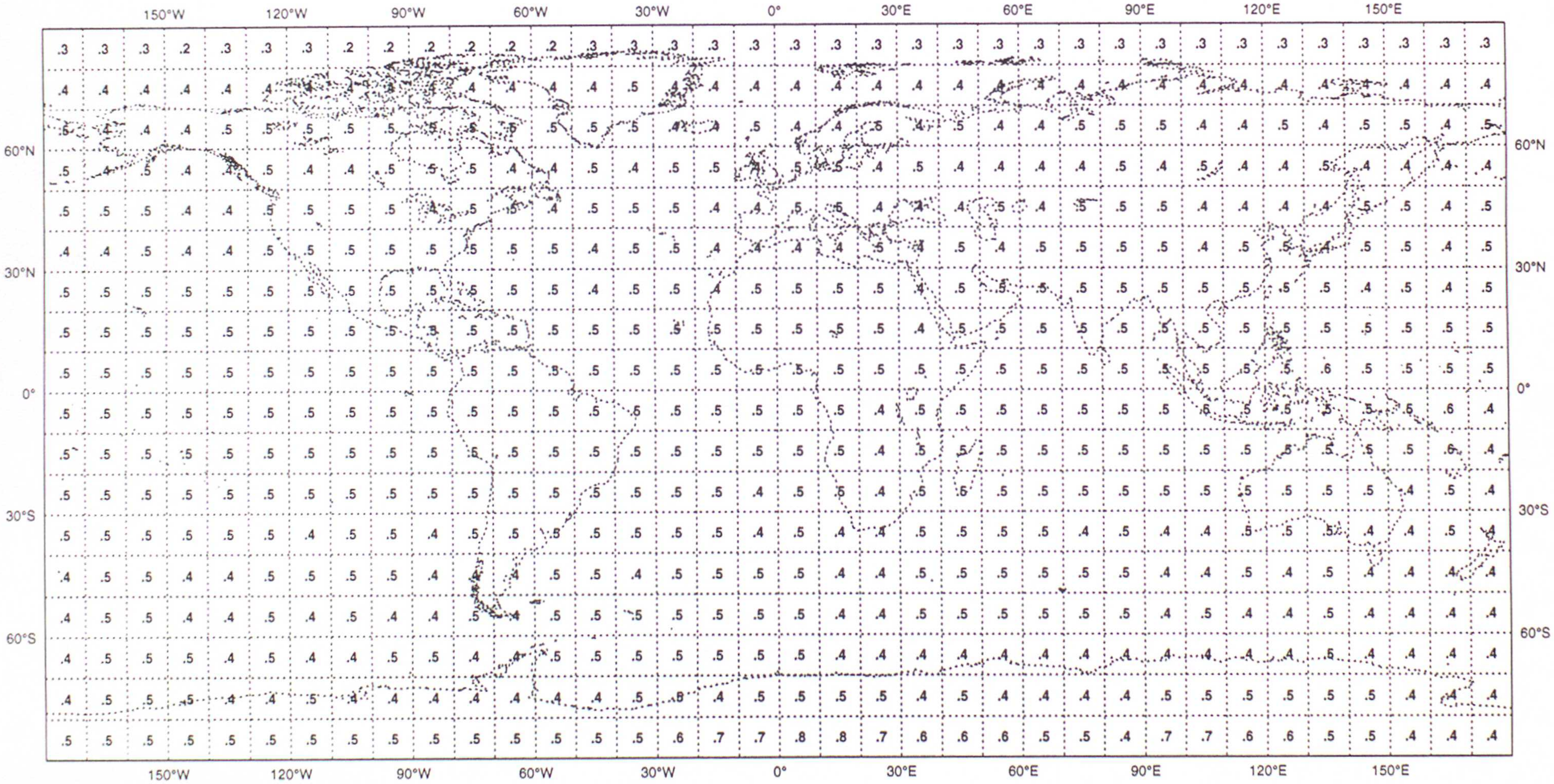
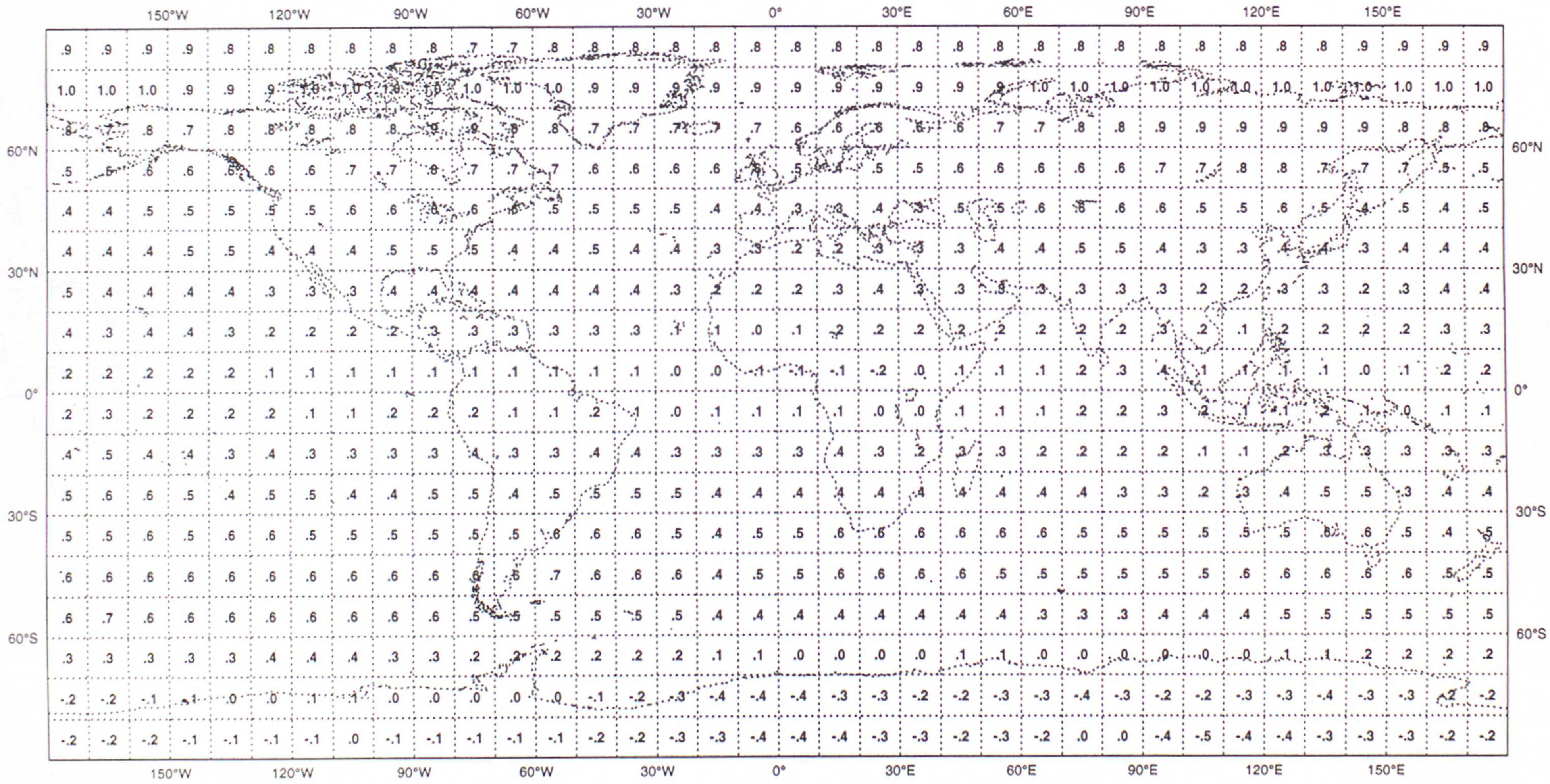

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
.4 .4 .4 .4 .4 .4 .4 .4 .5 .5 .5 .5 .5 .5 .4 .4 .4 .5 .4 .4 .4 .4 .4 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .4 .4 .4
.5 .5 .5 .5 .5 .5 .5 .3 .6 .6 .6 .6 .5 .5 .4 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5
.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .4 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5
.3 .4 .3 .3 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .4 .4 .3 .4 .4 .3 .3 .3 .3 .3 .3 .3 .3 .4 .4 .4 .4 .4 .4 .4 .4
.1 .2 .3 .2 .2 .3 .2 .3 .3 .4 .4 .3 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .1 .2 .3 .3 .3 .3 .2 .3 .3 .2 .3
.0 .1 .1 .1 .2 .1 .1 .1 .1 .2 .2 .1 .1 .0 .1 .1 .1 .2 .1 .1 .2 .1 .2 .1 .1 .1 .1 .2 .2 .2 .2 .1 .1 .2 .0 .1
.1 .0 .1 .1 .1 .0 .0 .0 .0 .1 .0 .0 .0 .0 .1 .1 .1 .1 .0 .0 .1 -.1 .1 .0 .0 .1 .1 .1 .1 .1 .1 .0 .0 .1 .0 .1
.1 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .1 .0 .0 .1 .1 .0 .1 .0 .0 .0 -.1 .0 -.1 -.1 .0 .0 .0 .0 .0 .0 .0 .0 .1 .0 .0
.1 .0 .0 .0 .0 .0 .0 -.1 -.1 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .1 .0 .0 .0 .0 .0 -.1 -.1 -.1 -.1 -.1 .0 .0 -.1 .0 .0 -.1
.0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .1 .0 .0 .0 .0 .0 -.1 .0 -.1 .0 .0 .0 .0 .0 .0 .1 -.1
.0 .0 .0 .1 .0 .1 .0 .0 .1 .0 .1 .1 .1 .1 .1 .1 .1 .0 .1 .1 .0 .1 .0 .1 .0 .0 .0 .0 .1 .0 .0 .1 .0 .0 .1 -.1
.1 .2 .1 .2 .1 .2 .1 .1 .2 .1 .2 .1 .1 .2 .2 .1 .2 .1 .2 .2 .1 .2 .1 .1 .1 .1 .2 .1 .1 .1 .1 .2 .2 .1 .1 .1
.2 .3 .2 .2 .2 .3 .2 .2 .2 .2 .3 .2 .2 .3 .2 .2 .2 .1 .2 .2 .2 .3 .2 .2 .2 .2 .3 .2 .3 .2 .2 .3 .3 .3 .3 .2
.3 .3 .3 .2 .3 .3 .2 .3 .3 .2 .3 .3 .3 .3 .3 .3 .3 .2 .3 .2 .2 .3 .3 .2 .3 .3 .3 .3 .3 .3 .2 .3 .3 .2 .2 .3
.3 .3 .3 .2 .3 .3 .2 .3 .2 .2 .2 .2 .2 .2 .3 .3 .2 .2 .2 .1 .2 .2 .2 .2 .2 .1 .1 .2 .1 .2 .2 .2 .3 .2 .2 .3
.1 .2 .2 .2 .1 .2 .2 .1 .1 .1 .1 .1 .0 .0 .1 .1 .1 .0 -.1 -.1 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .1 .1 .1 .1 .0 .1
-.1 -.1 -.1 -.1 .0 .0 .0 .0 -.1 .0 .0 .0 -.1 -.1 -.2 -.2 -.2 -.2 -.3 -.3 -.2 -.1 -.1 -.1 -.2 -.1 -.1 .1 .0 .0 .0 -.1 -.1 -.2 -.2 -.1
-.1 -.1 .0 .0 .0 .0 .0 .0 .1 .1 .0 .0 .0 .0 -.1 -.2 -.2 -.1 -.1 -.1 -.1 .0 .1 .1 .2 .3 .5 .0 -.1 .0 -.1 .0 -.1 -.1 -.1 -.1

Figure 37. ATOVS SD O-B brightness temperature differences (deg C). MAY 2003
Channel: AMSUA-7 (300 hPa)
NOAA15, using all observations



.3	.3	.3	.2	.3	.3	.3	.2	.2	.2	.2	.2	.2	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3
.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.5	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
.5	.4	.4	.4	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.4	.4	.5	.4	.4	.5	.4	.5	.4	.4	.5	.5	.5	.4	.4	.5	.4	.5	.5	.4	.5
.5	.4	.5	.4	.4	.5	.4	.4	.5	.5	.5	.4	.4	.5	.4	.5	.5	.4	.5	.5	.4	.5	.4	.4	.4	.4	.5	.4	.5	.4	.4	.5	.4	.4	.4	.4
.5	.5	.5	.4	.4	.5	.5	.5	.5	.4	.5	.5	.4	.5	.5	.5	.4	.4	.5	.6	.4	.4	.4	.5	.4	.5	.5	.5	.4	.4	.4	.4	.5	.5	.4	.5
.4	.4	.5	.4	.4	.5	.5	.5	.5	.5	.5	.5	.5	.4	.5	.5	.4	.4	.4	.4	.5	.4	.5	.4	.5	.5	.5	.5	.4	.5	.5	.4	.5	.5	.4	.5
.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.4	.5	.5	.4	.5	.5	.5	.5	.4	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.4	.5	.4	.5
.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.4	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5
.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.6	.5	.5	.5	.5
.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.6	.5	.5	.5	.5	.5	.4	.5	.5	.5	.5	.5	.5	.5	.6	.5	.5	.5	.5	.5	.6	.4
.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.4	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.6	.4
.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.4	.5	.6	.4	.5	.6	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.4	.5	.4
.5	.5	.5	.5	.5	.5	.4	.5	.5	.4	.5	.5	.5	.5	.5	.5	.5	.4	.5	.4	.4	.5	.5	.5	.5	.4	.5	.4	.4	.5	.5	.5	.4	.4	.5	.4
.4	.5	.5	.4	.4	.5	.5	.5	.5	.4	.4	.4	.5	.5	.4	.5	.5	.5	.5	.4	.4	.5	.5	.5	.5	.5	.5	.4	.4	.5	.4	.5	.4	.4	.4	.4
.4	.5	.5	.4	.4	.5	.4	.5	.4	.4	.5	.4	.5	.5	.5	.5	.5	.5	.5	.4	.4	.5	.5	.5	.5	.5	.5	.4	.5	.4	.4	.5	.4	.4	.4	.4
.4	.5	.5	.5	.4	.5	.4	.4	.5	.5	.4	.4	.5	.5	.5	.5	.5	.5	.5	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.5	.4	.4	.4	.4
.4	.5	.5	.5	.4	.4	.5	.4	.4	.4	.4	.4	.4	.4	.5	.8	.4	.5	.5	.5	.5	.4	.5	.4	.4	.4	.4	.5	.5	.5	.5	.5	.5	.4	.4	.4
.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.6	.7	.7	.8	.8	.7	.6	.6	.6	.5	.5	.4	.7	.7	.6	.6	.5	.5	.4	.4	.4

Figure 38. ATOVS MEAN O-B brightness temperature differences (deg C). MAY 2003
Channel: AMSUA-9 (100 hPa)
NOAA15, using all observations



.9	.9	.9	.9	.8	.8	.8	.8	.8	.8	.7	.7	.8	.8	.8	.8	.8	.8	.8	.8	.8	.8	.8	.8	.8	.8	.8	.8	.8	.8	.8	.8	.9	.9	.9	.9
1.0	1.0	1.0	.9	.9	.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
.8	.7	.8	.7	.8	.8	.8	.8	.8	.9	.9	.8	.8	.7	.7	.7	.7	.7	.6	.6	.6	.6	.6	.7	.7	.8	.8	.9	.9	.9	.9	.9	.9	.8	.8	.8
.5	.5	.6	.6	.6	.6	.6	.7	.7	.8	.7	.7	.7	.6	.6	.6	.6	.6	.5	.4	.5	.5	.6	.6	.6	.6	.6	.7	.7	.8	.8	.7	.7	.7	.5	.5
.4	.4	.5	.5	.5	.5	.5	.6	.6	.6	.6	.6	.5	.5	.5	.5	.4	.4	.3	.3	.4	.3	.5	.5	.6	.6	.6	.6	.5	.5	.6	.5	.4	.5	.4	.5
.4	.4	.4	.5	.5	.4	.4	.4	.5	.5	.5	.4	.4	.5	.4	.4	.3	.3	.2	.2	.3	.3	.3	.4	.4	.5	.5	.4	.3	.3	.4	.4	.3	.4	.4	.4
.5	.4	.4	.4	.4	.3	.3	.3	.4	.4	.4	.4	.4	.4	.4	.3	.2	.2	.2	.3	.4	.3	.3	.3	.3	.3	.3	.3	.2	.2	.3	.3	.2	.3	.4	.4
.4	.3	.4	.4	.3	.2	.2	.2	.2	.3	.3	.3	.3	.3	.3	.1	.1	.0	.1	.2	.2	.2	.2	.2	.2	.2	.2	.3	.2	.1	.2	.2	.2	.2	.3	.3
.2	.2	.2	.2	.2	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.0	.0	-.1	-.1	-.1	-.2	.0	.1	.1	.1	.2	.3	.4	.1	.1	.1	.1	.0	.1	.2	.2
.2	.3	.2	.2	.2	.2	.1	.1	.2	.2	.2	.1	.1	.2	.1	.0	.1	.1	.1	.1	.0	.0	.1	.1	.1	.2	.2	.3	.2	.1	.1	.2	.1	.0	.1	.1
.4	.5	.4	.4	.3	.4	.3	.3	.3	.3	.4	.3	.3	.4	.4	.3	.3	.3	.3	.4	.3	.2	.3	.3	.2	.2	.2	.2	.1	.1	.2	.3	.3	.3	.3	.3
.5	.6	.6	.5	.4	.5	.5	.4	.4	.5	.5	.4	.5	.5	.5	.5	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.3	.3	.2	.3	.4	.5	.5	.3	.4	.4
.5	.5	.6	.5	.6	.6	.5	.5	.5	.5	.5	.5	.6	.6	.6	.5	.4	.5	.5	.6	.6	.6	.6	.6	.6	.5	.5	.5	.5	.5	.5	.6	.6	.5	.4	.5
.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.7	.6	.6	.6	.4	.5	.5	.6	.6	.6	.6	.5	.5	.5	.5	.5	.5	.6	.6	.6	.6	.6	.5	.5
.6	.7	.6	.6	.6	.6	.6	.6	.6	.6	.5	.5	.5	.5	.5	.5	.4	.4	.4	.4	.4	.4	.4	.4	.3	.3	.3	.4	.4	.4	.5	.5	.5	.5	.5	.5
.3	.3	.3	.3	.3	.4	.4	.4	.3	.3	.2	.2	.2	.2	.2	.2	.1	.1	.0	.0	.0	.0	.1	.1	.0	.0	.0	.0	.0	.0	.1	.1	.2	.2	.2	.2
-.2	-.2	-.1	-.1	.0	.0	.1	.1	.0	.0	.0	.0	.0	-.1	-.2	-.3	-.4	-.4	-.4	-.3	-.3	-.2	-.2	-.3	-.3	-.4	-.3	-.2	-.2	-.3	-.3	-.4	-.3	-.3	-.2	-.2
-.2	-.2	-.2	-.1	-.1	-.1	-.1	.0	-.1	-.1	-.1	-.1	-.1	-.2	-.2	-.3	-.3	-.4	-.4	-.4	-.3	-.3	-.2	-.3	-.2	.0	.0	-.4	-.5	-.4	-.4	-.3	-.3	-.3	-.2	-.2

Figure 39. ATOVS SD O-B brightness temperature differences (deg C). MAY 2003
Channel: AMSUA-9 (100 hPa)
NOAA15, using all observations

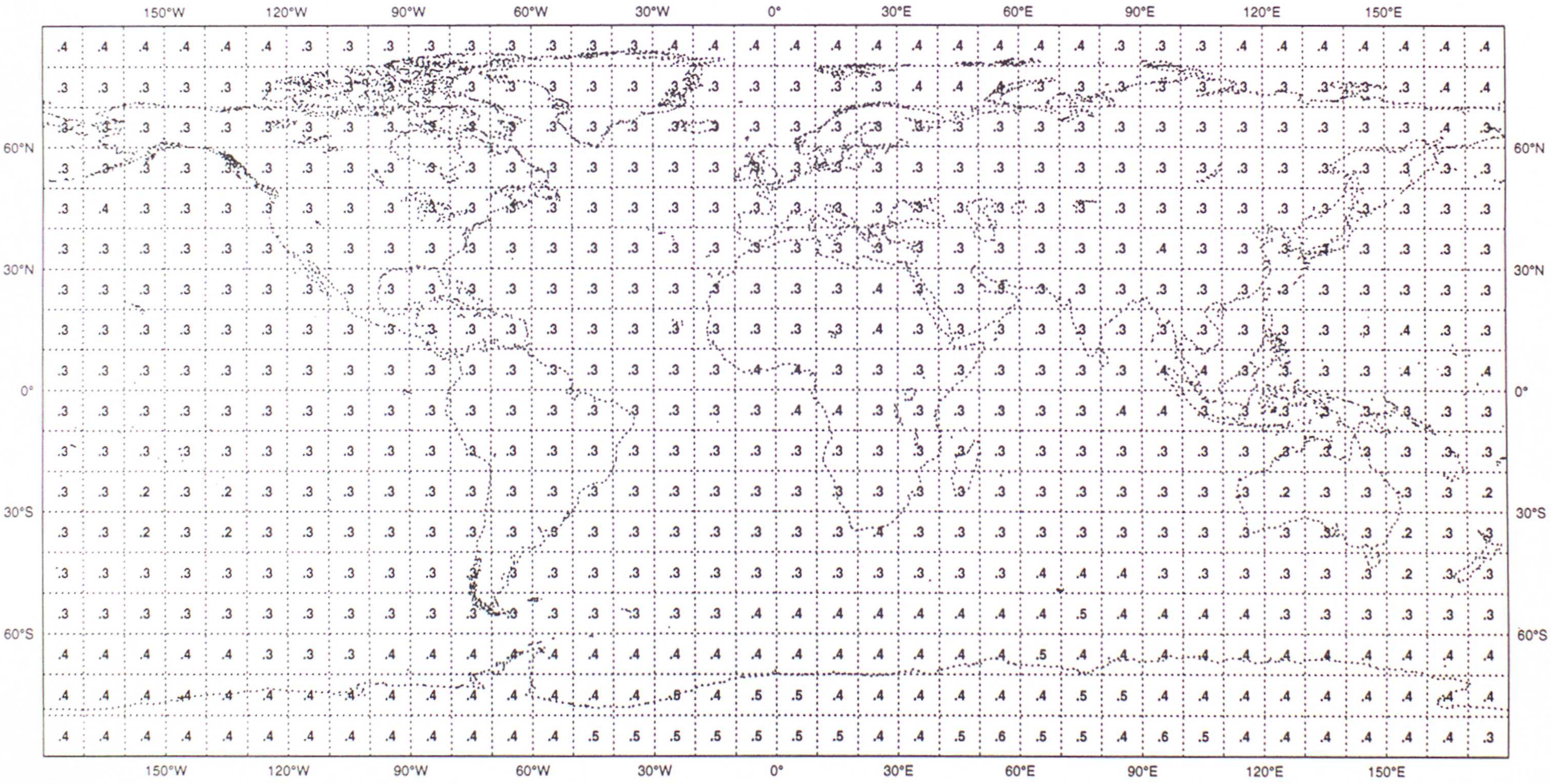
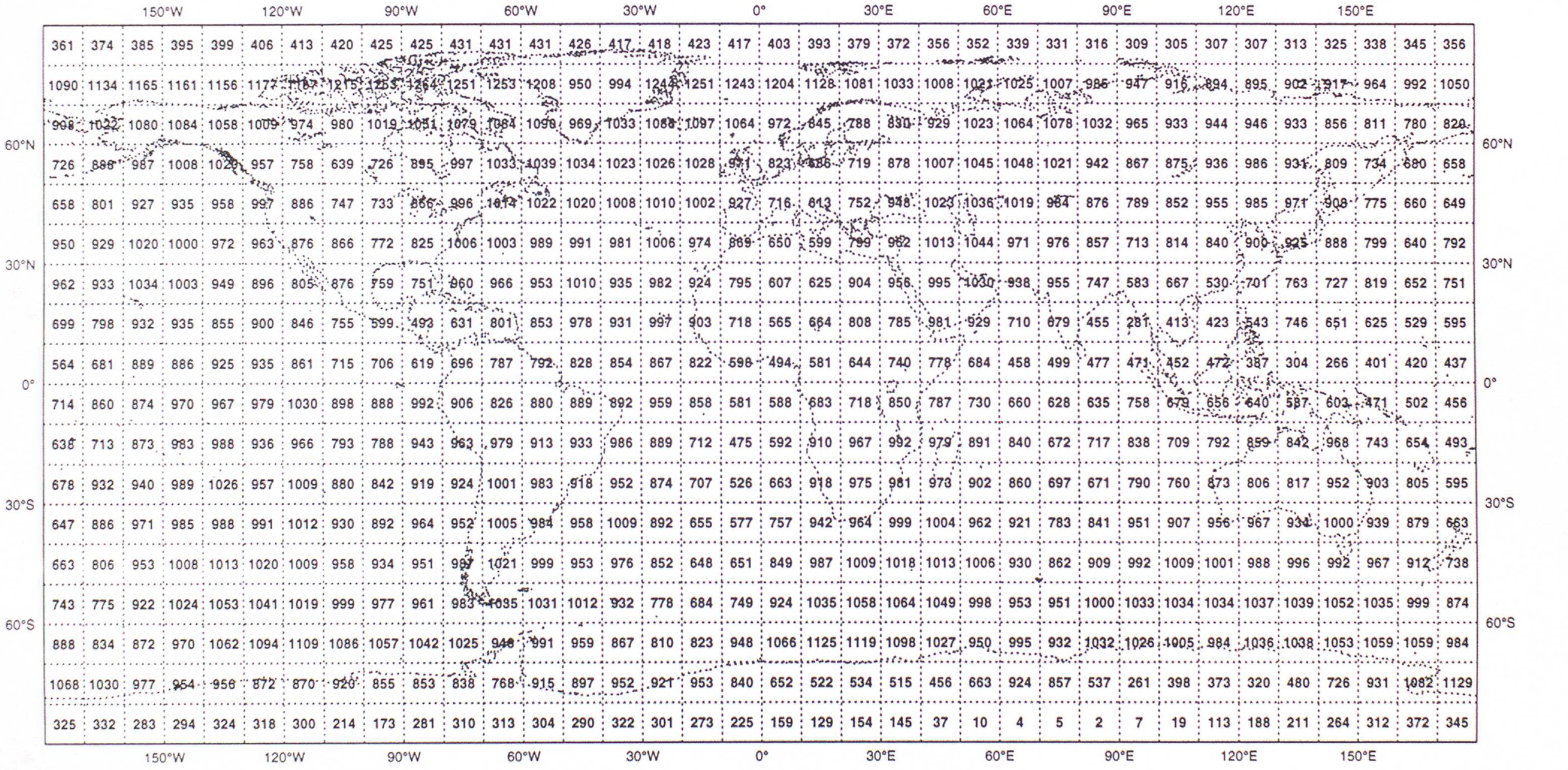

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 40. ATOVS mean daily count. MAY 2003
NOAA16, using all observations
Global average number of observations in 24 hours = 525057



361	374	385	395	399	406	413	420	425	425	431	431	431	426	417	418	423	417	403	393	379	372	356	352	339	331	316	309	305	307	307	313	325	338	345	356
1090	1134	1165	1161	1156	1177	1187	1215	1253	1264	1251	1253	1208	950	994	1248	1251	1243	1204	1128	1081	1033	1008	1021	1025	1007	986	947	916	894	895	902	917	964	992	1050
908	1022	1080	1084	1058	1009	974	980	1019	1051	1079	1084	1090	969	1033	1088	1097	1064	972	845	788	830	929	1023	1064	1078	1032	965	933	944	946	933	856	811	780	820
726	886	987	1008	1020	957	758	639	726	895	997	1033	1039	1034	1023	1026	1028	971	823	686	719	878	1007	1045	1048	1021	942	867	875	936	986	931	809	734	680	658
658	801	927	935	958	997	886	747	733	866	996	1014	1022	1020	1008	1010	1002	927	716	813	752	948	1023	1036	1019	984	876	789	852	955	985	971	908	775	660	649
950	929	1020	1000	972	963	876	866	772	825	1006	1003	989	991	981	1006	974	869	650	599	799	962	1013	1044	971	976	857	713	814	840	900	925	888	799	640	792
962	933	1034	1003	949	896	805	876	759	751	960	966	953	1010	935	982	924	795	607	625	904	956	995	1030	938	955	747	583	667	530	701	763	727	819	652	751
699	798	932	935	855	900	846	755	599	493	631	801	853	978	931	997	903	718	565	664	808	785	981	929	710	679	455	281	413	423	543	746	651	625	529	595
564	681	889	886	925	935	861	715	706	619	696	787	792	828	854	867	822	598	494	581	644	740	778	684	458	499	477	471	452	472	387	304	266	401	420	437
714	860	874	970	967	979	1030	898	888	992	906	826	880	889	892	959	858	581	588	683	718	850	787	730	660	628	635	758	679	656	640	587	603	471	502	456
638	713	873	983	988	936	966	793	788	943	963	979	913	933	986	889	712	475	592	910	967	992	979	891	840	672	717	838	709	792	859	842	968	743	654	493
678	932	940	989	1026	957	1009	880	842	919	924	1001	983	918	952	874	707	526	663	918	975	981	973	902	860	697	671	790	760	873	806	817	952	903	805	595
647	886	971	985	988	991	1012	930	892	964	952	1005	984	958	1009	892	655	577	757	942	964	999	1004	962	921	783	841	951	907	956	967	934	1000	939	879	663
663	806	953	1008	1013	1020	1009	958	934	951	987	1021	999	953	976	852	648	651	849	987	1009	1018	1013	1006	930	862	909	992	1009	1001	988	996	992	967	912	738
743	775	922	1024	1053	1041	1019	999	977	961	983	1035	1031	1012	932	778	684	749	924	1035	1058	1064	1049	998	953	951	1000	1033	1034	1034	1037	1039	1052	1035	999	874
888	834	872	970	1062	1094	1109	1086	1057	1042	1025	948	991	959	867	810	823	948	1066	1125	1119	1098	1027	950	995	932	1032	1026	1005	984	1036	1038	1053	1059	1059	984
1068	1030	977	954	956	872	870	920	855	853	838	768	915	897	952	921	953	840	652	522	534	515	456	663	924	857	537	261	398	373	320	480	726	931	1082	1129
325	332	283	294	324	318	300	214	173	281	310	313	304	290	322	301	273	225	159	129	154	145	37	10	4	5	2	7	19	113	188	211	264	312	372	345

Figure 41. ATOVS MEAN O-B brightness temperature differences (deg C). MAY 2003
Channel: HIRS8 (Surface)
NOAA16, using all observations

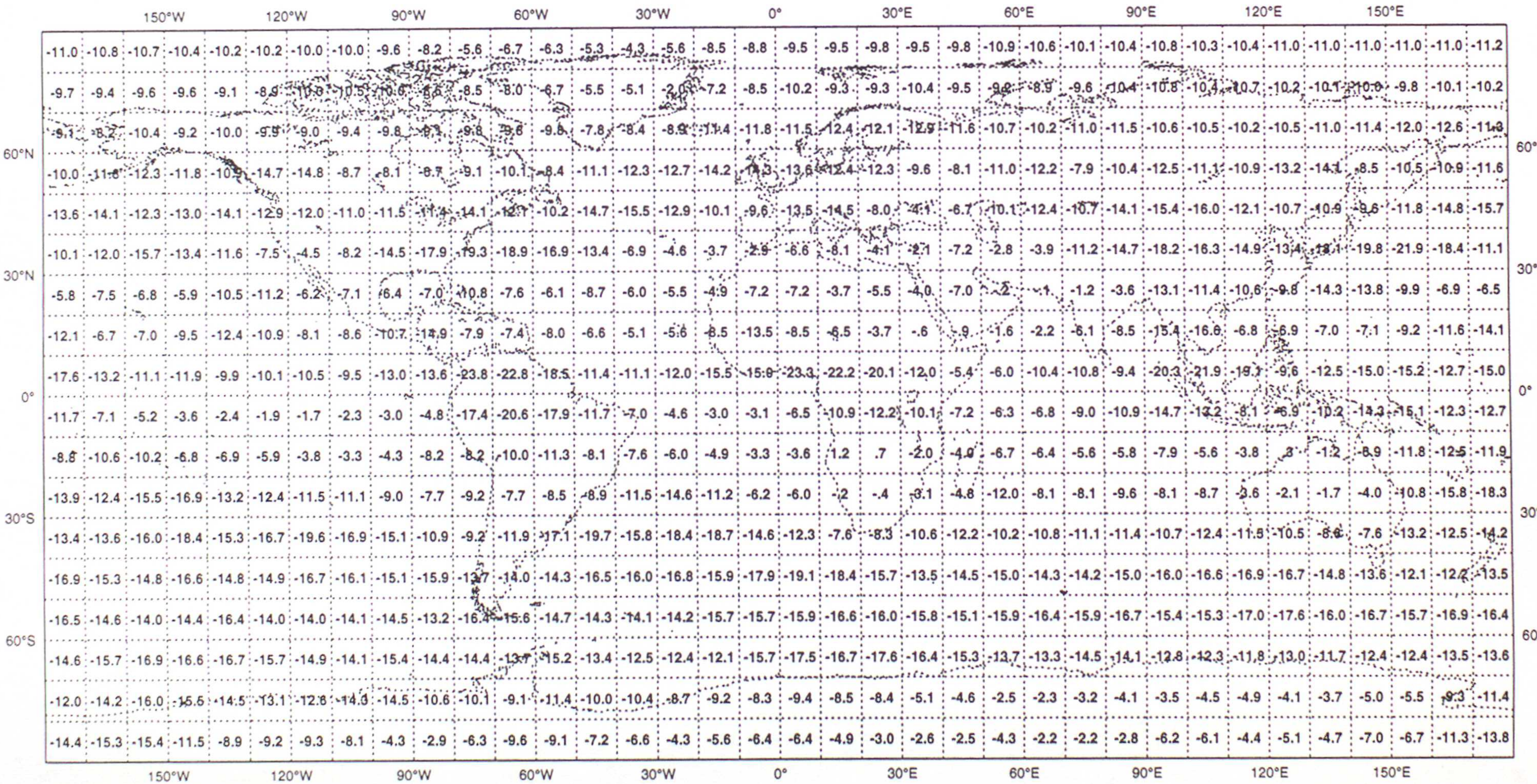
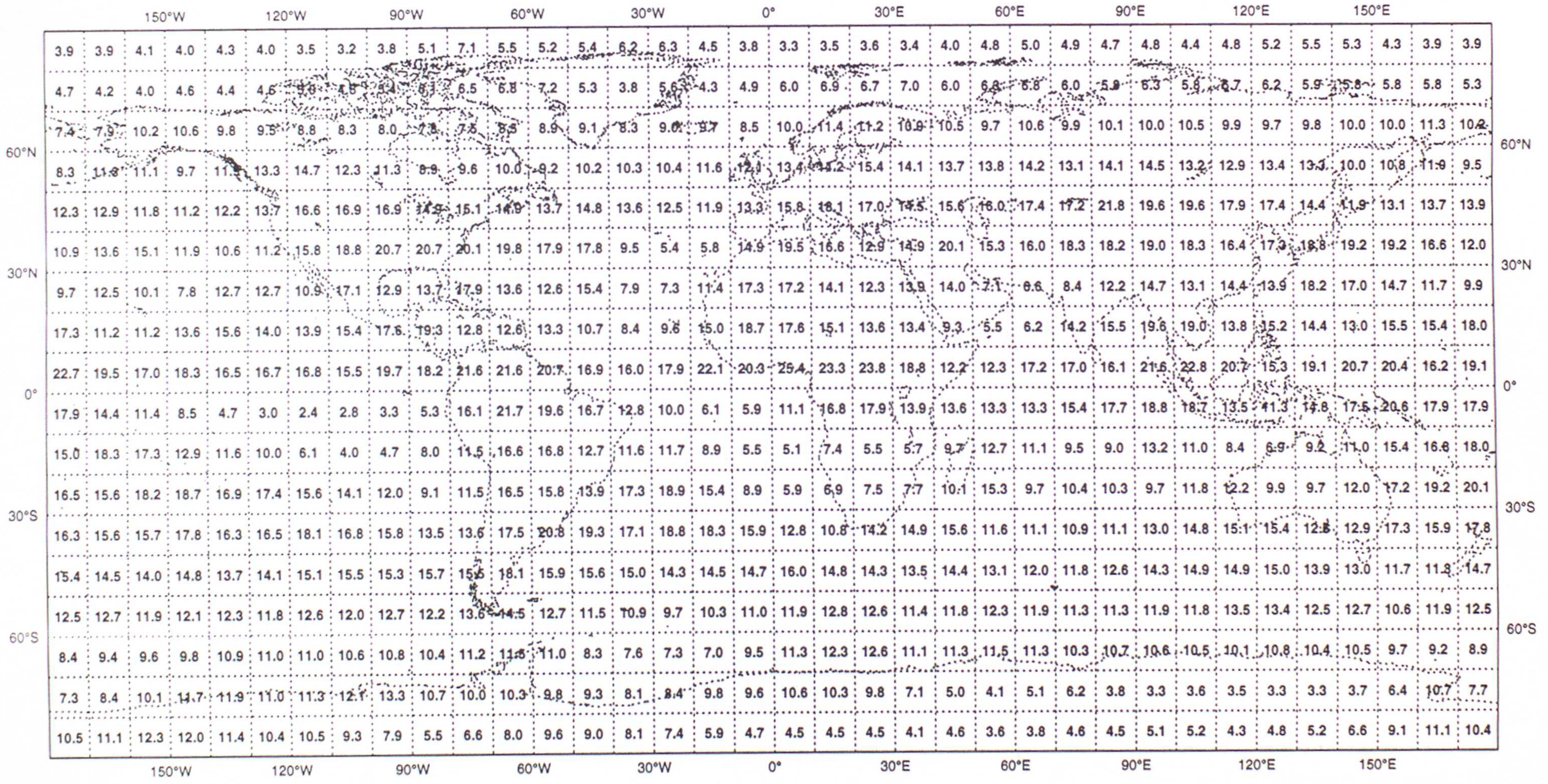

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
-11.0 -10.8 -10.7 -10.4 -10.2 -10.2 -10.0 -10.0 -9.6 -8.2 -5.6 -6.7 -6.3 -5.3 -4.3 -5.6 -8.5 -8.8 -9.5 -9.5 -9.8 -9.5 -9.8 -10.9 -10.6 -10.1 -10.4 -10.8 -10.3 -10.4 -11.0 -11.0 -11.0 -11.0 -11.0 -11.2
-9.7 -9.4 -9.6 -9.6 -9.1 -8.9 -10.0 -10.5 -10.6 -8.6 -8.5 -8.0 -6.7 -5.5 -5.1 -2.0 -7.2 -8.5 -10.2 -9.3 -9.3 -10.4 -9.5 -9.2 -8.9 -9.6 -10.4 -10.8 -10.4 -10.7 -10.2 -10.1 -10.0 -9.8 -10.1 -10.2
-9.1 -8.2 -10.4 -9.2 -10.0 -9.9 -9.0 -9.4 -9.8 -9.1 -9.8 -9.6 -9.8 -7.8 -8.4 -8.9 -11.4 -11.8 -11.5 -12.4 -12.1 -12.9 -11.6 -10.7 -10.2 -11.0 -11.5 -10.6 -10.5 -10.2 -10.5 -11.0 -11.4 -12.0 -12.6 -11.8
-10.0 -11.6 -12.3 -11.8 -10.9 -14.7 -14.8 -8.7 -8.1 -8.7 -9.1 -10.1 -8.4 -11.1 -12.3 -12.7 -14.2 -14.3 -13.6 -12.4 -12.3 -9.6 -8.1 -11.0 -12.2 -7.9 -10.4 -12.5 -11.1 -10.9 -13.2 -14.1 -8.5 -10.5 -10.9 -11.6
-13.6 -14.1 -12.3 -13.0 -14.1 -12.9 -12.0 -11.0 -11.5 -11.4 -14.1 -12.1 -10.2 -14.7 -15.5 -12.9 -10.1 -9.6 -13.5 -14.5 -8.0 -4.1 -6.7 -10.1 -12.4 -10.7 -14.1 -15.4 -16.0 -12.1 -10.7 -10.9 -9.6 -11.8 -14.8 -15.7
-10.1 -12.0 -15.7 -13.4 -11.6 -7.5 -4.5 -8.2 -14.5 -17.9 -19.3 -18.9 -16.9 -13.4 -6.9 -4.6 -3.7 -2.9 -6.6 -8.1 -4.1 -2.1 -7.2 -2.8 -3.9 -11.2 -14.7 -18.2 -16.3 -14.9 -13.4 -18.1 -19.8 -21.9 -18.4 -11.1
-5.8 -7.5 -6.8 -5.9 -10.5 -11.2 -6.2 -7.1 -6.4 -7.0 -10.8 -7.6 -6.1 -8.7 -6.0 -5.5 -4.9 -7.2 -7.2 -3.7 -5.5 -4.0 -7.0 -.2 -.1 -1.2 -3.6 -13.1 -11.4 -10.6 -9.8 -14.3 -13.8 -9.9 -6.9 -6.5
-12.1 -6.7 -7.0 -9.5 -12.4 -10.9 -8.1 -8.6 -10.7 -14.9 -7.9 -7.4 -8.0 -6.6 -5.1 -5.6 -8.5 -13.5 -8.5 -6.5 -3.7 -.6 -.9 -1.6 -2.2 -6.1 -8.5 -15.4 -16.6 -6.8 -6.9 -7.0 -7.1 -9.2 -11.6 -14.1
-17.6 -13.2 -11.1 -11.9 -9.9 -10.1 -10.5 -9.5 -13.0 -13.6 -23.8 -22.8 -18.5 -11.4 -11.1 -12.0 -15.5 -15.0 -23.3 -22.2 -20.1 -12.0 -5.4 -6.0 -10.4 -10.8 -9.4 -20.3 -21.9 -19.7 -9.6 -12.5 -15.0 -15.2 -12.7 -15.0
-11.7 -7.1 -5.2 -3.6 -2.4 -1.9 -1.7 -2.3 -3.0 -4.8 -17.4 -20.6 -17.9 -11.7 -7.0 -4.6 -3.0 -3.1 -6.5 -10.9 -12.2 -10.1 -7.2 -6.3 -6.8 -9.0 -10.9 -14.7 -13.2 -8.1 -6.9 -10.2 -14.3 -15.1 -12.3 -12.7
-8.8 -10.6 -10.2 -6.8 -6.9 -5.9 -3.8 -3.3 -4.3 -8.2 -8.2 -10.0 -11.3 -8.1 -7.6 -6.0 -4.9 -3.3 -3.6 1.2 .7 -2.0 -4.0 -6.7 -6.4 -5.6 -5.8 -7.9 -5.6 -3.8 .3 -1.2 -8.9 -11.8 -12.5 -11.9
-13.9 -12.4 -15.5 -16.9 -13.2 -12.4 -11.5 -11.1 -9.0 -7.7 -9.2 -7.7 -8.5 -8.9 -11.5 -14.6 -11.2 -6.2 -6.0 -.2 -.4 -3.1 -4.8 -12.0 -8.1 -8.1 -9.6 -8.1 -8.7 -3.6 -2.1 -1.7 -4.0 -10.8 -15.8 -18.3
-13.4 -13.6 -16.0 -18.4 -15.3 -16.7 -19.6 -16.9 -15.1 -10.9 -9.2 -11.9 -17.1 -19.7 -15.8 -18.4 -18.7 -14.6 -12.3 -7.6 -8.3 -10.6 -12.2 -10.2 -10.8 -11.1 -11.4 -10.7 -12.4 -11.5 -10.5 -8.6 -7.6 -13.2 -12.5 -14.2
-16.9 -15.3 -14.8 -16.6 -14.8 -14.9 -16.7 -16.1 -15.1 -15.9 -13.7 -14.0 -14.3 -16.5 -16.0 -16.8 -15.9 -17.9 -19.1 -18.4 -15.7 -13.5 -14.5 -15.0 -14.3 -14.2 -15.0 -16.0 -16.6 -16.9 -16.7 -14.8 -13.6 -12.1 -12.2 -13.5
-16.5 -14.6 -14.0 -14.4 -16.4 -14.0 -14.0 -14.1 -14.5 -13.2 -16.4 -15.6 -14.7 -14.3 -14.1 -14.2 -15.7 -15.7 -15.9 -16.6 -16.0 -15.8 -15.1 -15.9 -16.4 -15.9 -16.7 -15.4 -15.3 -17.0 -17.6 -16.0 -16.7 -15.7 -16.9 -16.4
-14.6 -15.7 -16.9 -16.6 -16.7 -15.7 -14.9 -14.1 -15.4 -14.4 -14.4 -13.7 -15.2 -13.4 -12.5 -12.4 -12.1 -15.7 -17.5 -16.7 -17.6 -16.4 -15.3 -13.7 -13.3 -14.5 -14.1 -12.8 -12.3 -11.8 -13.0 -11.7 -12.4 -12.4 -13.5 -13.6
-12.0 -14.2 -16.0 -15.6 -14.5 -13.1 -12.8 -14.3 -14.5 -10.6 -10.1 -9.1 -11.4 -10.0 -10.4 -8.7 -9.2 -8.3 -9.4 -8.5 -8.4 -5.1 -4.6 -2.5 -2.3 -3.2 -4.1 -3.5 -4.5 -4.9 -4.1 -3.7 -5.0 -5.5 -9.3 -11.4
-14.4 -15.3 -15.4 -11.5 -8.9 -9.2 -9.3 -8.1 -4.3 -2.9 -6.3 -9.6 -9.1 -7.2 -6.6 -4.3 -5.6 -6.4 -6.4 -4.9 -3.0 -2.6 -2.5 -4.3 -2.2 -2.2 -2.8 -6.2 -6.1 -4.4 -5.1 -4.7 -7.0 -6.7 -11.3 -13.8

Figure 42. ATOVS SD O-B brightness temperature differences (deg C). MAY 2003
Channel: HIRS8 (Surface)
NOAA16, using all observations



3.9	3.9	4.1	4.0	4.3	4.0	3.5	3.2	3.8	5.1	7.1	5.5	5.2	5.4	6.2	6.3	4.5	3.8	3.3	3.5	3.6	3.4	4.0	4.8	5.0	4.9	4.7	4.8	4.4	4.8	5.2	5.5	5.3	4.3	3.9	3.9
4.7	4.2	4.0	4.6	4.4	4.6	5.0	4.8	5.4	6.1	6.5	6.8	7.2	5.3	3.8	5.6	4.3	4.9	6.0	6.9	6.7	7.0	6.0	6.8	6.8	6.0	5.9	6.3	5.8	6.7	6.2	5.9	5.8	5.8	5.8	5.3
7.4	7.9	10.2	10.6	9.8	9.5	8.8	8.3	8.0	7.8	7.5	8.5	8.9	9.1	8.3	9.0	9.7	8.5	10.0	11.4	11.2	10.9	10.5	9.7	10.6	9.9	10.1	10.0	10.5	9.9	9.7	9.8	10.0	10.0	11.3	10.2
8.3	11.8	11.1	9.7	11.5	13.3	14.7	12.3	11.3	8.9	9.6	10.0	9.2	10.2	10.3	10.4	11.6	12.1	13.4	14.2	15.4	14.1	13.7	13.8	14.2	13.1	14.1	14.5	13.2	12.9	13.4	13.3	10.0	10.8	11.9	9.5
12.3	12.9	11.8	11.2	12.2	13.7	16.6	16.9	16.9	14.9	15.1	14.9	13.7	14.8	13.6	12.5	11.9	13.3	15.8	18.1	17.0	14.5	15.6	16.0	17.4	17.2	21.8	19.6	19.6	17.9	17.4	14.4	11.9	13.1	13.7	13.9
10.9	13.6	15.1	11.9	10.6	11.2	15.8	18.8	20.7	20.7	20.1	19.8	17.9	17.8	9.5	5.4	5.8	14.9	19.5	16.6	12.9	14.9	20.1	15.3	16.0	18.3	18.2	19.0	18.3	16.4	17.3	18.8	19.2	19.2	16.6	12.0
9.7	12.5	10.1	7.8	12.7	12.7	10.9	17.1	12.9	13.7	17.9	13.6	12.6	15.4	7.9	7.3	11.4	17.3	17.2	14.1	12.3	13.9	14.0	7.1	6.6	8.4	12.2	14.7	13.1	14.4	13.9	18.2	17.0	14.7	11.7	9.9
17.3	11.2	11.2	13.6	15.6	14.0	13.9	15.4	17.6	19.3	12.8	12.6	13.3	10.7	8.4	9.6	15.0	18.7	17.6	15.1	13.6	13.4	9.3	5.5	6.2	14.2	15.5	19.6	19.0	13.8	15.2	14.4	13.0	15.5	15.4	18.0
22.7	19.5	17.0	18.3	16.5	16.7	16.8	15.5	19.7	18.2	21.6	21.6	20.7	16.9	16.0	17.9	22.1	20.3	25.4	23.3	23.8	18.8	12.2	12.3	17.2	17.0	16.1	21.6	22.8	20.7	15.3	19.1	20.7	20.4	16.2	19.1
17.9	14.4	11.4	8.5	4.7	3.0	2.4	2.8	3.3	5.3	16.1	21.7	19.6	16.7	12.8	10.0	6.1	5.9	11.1	16.8	17.9	13.9	13.6	13.3	13.3	15.4	17.7	18.8	18.7	13.5	11.3	14.8	17.5	20.6	17.9	17.9
15.0	18.3	17.3	12.9	11.6	10.0	6.1	4.0	4.7	8.0	11.5	16.6	16.8	12.7	11.6	11.7	8.9	5.5	5.1	7.4	5.5	5.7	9.7	12.7	11.1	9.5	9.0	13.2	11.0	8.4	6.9	9.2	11.0	15.4	16.8	18.0
16.5	15.6	18.2	18.7	16.9	17.4	15.6	14.1	12.0	9.1	11.5	16.5	15.8	13.9	17.3	18.9	15.4	8.9	5.9	6.9	7.5	7.7	10.1	15.3	9.7	10.4	10.3	9.7	11.8	12.2	9.9	9.7	12.0	17.2	19.2	20.1
16.3	15.6	15.7	17.8	16.3	16.5	18.1	16.8	15.8	13.5	13.6	17.5	20.8	19.3	17.1	18.8	18.3	15.9	12.8	10.8	14.2	14.9	15.6	11.6	11.1	10.9	11.1	13.0	14.8	15.1	15.4	12.8	12.9	17.3	15.9	17.8
15.4	14.5	14.0	14.8	13.7	14.1	15.1	15.5	15.3	15.7	15.6	18.1	15.9	15.6	15.0	14.3	14.5	14.7	16.0	14.8	14.3	13.5	14.4	13.1	12.0	11.8	12.6	14.3	14.9	14.9	15.0	13.9	13.0	11.7	11.8	14.7
12.5	12.7	11.9	12.1	12.3	11.8	12.6	12.0	12.7	12.2	13.6	14.5	12.7	11.5	10.9	9.7	10.3	11.0	11.9	12.8	12.6	11.4	11.8	12.3	11.9	11.3	11.3	11.9	11.8	13.5	13.4	12.5	12.7	10.6	11.9	12.5
8.4	9.4	9.6	9.8	10.9	11.0	11.0	10.6	10.8	10.4	11.2	11.5	11.0	8.3	7.6	7.3	7.0	9.5	11.3	12.3	12.6	11.1	11.3	11.5	11.3	10.3	10.7	10.6	10.5	10.1	10.8	10.4	10.5	9.7	9.2	8.9
7.3	8.4	10.1	14.7	11.9	11.0	11.3	12.1	13.3	10.7	10.0	10.3	9.8	9.3	8.1	8.4	9.8	9.6	10.6	10.3	9.8	7.1	5.0	4.1	5.1	6.2	3.8	3.3	3.6	3.5	3.3	3.3	3.7	6.4	10.7	7.7
10.5	11.1	12.3	12.0	11.4	10.4	10.5	9.3	7.9	5.5	6.6	8.0	9.6	9.0	8.1	7.4	5.9	4.7	4.5	4.5	4.5	4.1	4.6	3.6	3.8	4.6	4.5	5.1	5.2	4.3	4.8	5.2	6.6	9.1	11.1	10.4

Figure 43. ATOVS MEAN O-B brightness temperature differences (deg C). MAY 2003
Channel: HIRS15 (700 hPa)
NOAA16, using all observations

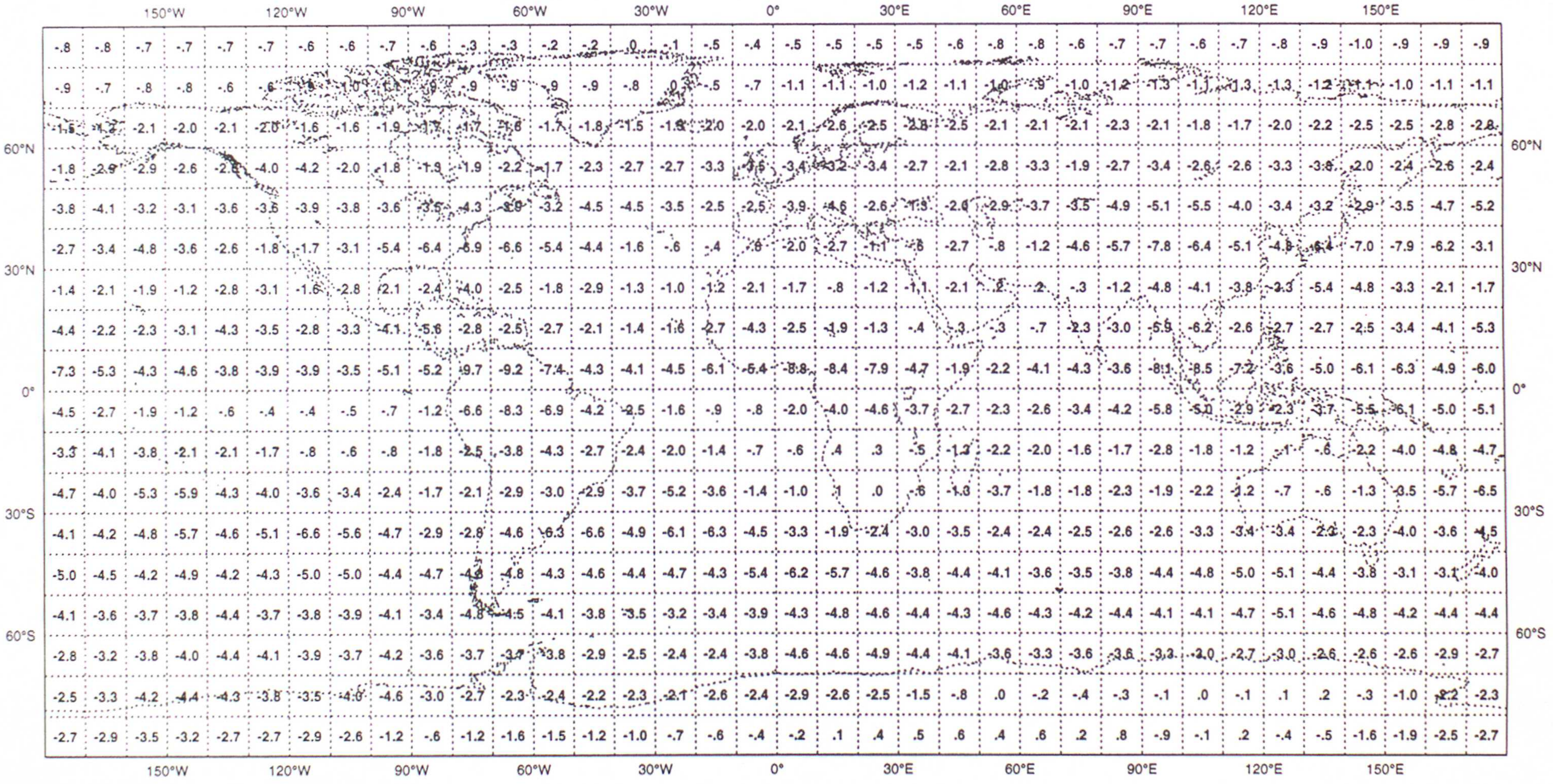

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
-.8 -.8 -.7 -.7 -.7 -.7 -.6 -.6 -.7 -.6 -.3 -.3 -.2 -.2 0 -.1 -.5 -.4 -.5 -.5 -.5 -.5 -.6 -.8 -.8 -.6 -.7 -.7 -.6 -.7 -.8 -.9 -1.0 -.9 -.9 -.9
-.9 -.7 -.8 -.8 -.6 -.6 -.9 -1.0 -1.1 -.9 -.9 -.9 -.9 -.9 -.8 0 -.5 -.7 -1.1 -1.1 -1.0 -1.2 -1.1 -1.0 -.9 -1.0 -1.2 -1.3 -1.1 -1.3 -1.3 -1.2 -1.1 -1.0 -1.1 -1.1
-1.5 -1.2 -2.1 -2.0 -2.1 -2.0 -1.6 -1.6 -1.9 -1.7 -1.7 -1.6 -1.7 -1.8 -1.5 -1.8 -2.0 -2.0 -2.1 -2.6 -2.5 -2.8 -2.5 -2.1 -2.1 -2.1 -2.3 -2.1 -1.8 -1.7 -2.0 -2.2 -2.5 -2.5 -2.8 -2.8
-1.8 -2.9 -2.9 -2.6 -2.8 -4.0 -4.2 -2.0 -1.8 -1.9 -1.9 -2.2 -1.7 -2.3 -2.7 -2.7 -3.3 -3.5 -3.4 -3.2 -3.4 -2.7 -2.1 -2.8 -3.3 -1.9 -2.7 -3.4 -2.6 -2.6 -3.3 -3.8 -2.0 -2.4 -2.6 -2.4
-3.8 -4.1 -3.2 -3.1 -3.6 -3.6 -3.9 -3.8 -3.6 -3.5 -4.3 -3.9 -3.2 -4.5 -4.5 -3.5 -2.5 -2.5 -3.9 -4.6 -2.6 -1.3 -2.0 -2.9 -3.7 -3.5 -4.9 -5.1 -5.5 -4.0 -3.4 -3.2 -2.9 -3.5 -4.7 -5.2
-2.7 -3.4 -4.8 -3.6 -2.6 -1.8 -1.7 -3.1 -5.4 -6.4 -6.9 -6.6 -5.4 -4.4 -1.6 -.6 -.4 -.8 -2.0 -2.7 -1.1 -.6 -2.7 -.8 -1.2 -4.6 -5.7 -7.8 -6.4 -5.1 -4.8 -6.4 -7.0 -7.9 -6.2 -3.1
-1.4 -2.1 -1.9 -1.2 -2.8 -3.1 -1.6 -2.8 -2.1 -2.4 -4.0 -2.5 -1.8 -2.9 -1.3 -1.0 -1.2 -2.1 -1.7 -.8 -1.2 -1.1 -2.1 .2 .2 -.3 -1.2 -4.8 -4.1 -3.8 -3.3 -5.4 -4.8 -3.3 -2.1 -1.7
-4.4 -2.2 -2.3 -3.1 -4.3 -3.5 -2.8 -3.3 -4.1 -5.6 -2.8 -2.5 -2.7 -2.1 -1.4 -1.6 -2.7 -4.3 -2.5 -1.9 -1.3 -.4 -.3 -.3 -.7 -2.3 -3.0 -5.9 -6.2 -2.6 -2.7 -2.7 -2.5 -3.4 -4.1 -5.3
-7.3 -5.3 -4.3 -4.6 -3.8 -3.9 -3.9 -3.5 -5.1 -5.2 -9.7 -9.2 -7.4 -4.3 -4.1 -4.5 -6.1 -5.4 -8.8 -8.4 -7.9 -4.7 -1.9 -2.2 -4.1 -4.3 -3.6 -8.1 -8.5 -7.2 -3.6 -5.0 -6.1 -6.3 -4.9 -6.0
-4.5 -2.7 -1.9 -1.2 -.6 -.4 -.4 -.5 -.7 -1.2 -6.6 -8.3 -6.9 -4.2 -2.5 -1.6 -.9 -.8 -2.0 -4.0 -4.6 -3.7 -2.7 -2.3 -2.6 -3.4 -4.2 -5.8 -5.0 -2.9 -2.3 -3.7 -5.5 -6.1 -5.0 -5.1
-3.3 -4.1 -3.8 -2.1 -2.1 -1.7 -.8 -.6 -.8 -1.8 -2.5 -3.8 -4.3 -2.7 -2.4 -2.0 -1.4 -.7 -.6 .4 .3 -.5 -1.2 -2.2 -2.0 -1.6 -1.7 -2.8 -1.8 -1.2 -.1 -.6 -2.2 -4.0 -4.8 -4.7
-4.7 -4.0 -5.3 -5.9 -4.3 -4.0 -3.6 -3.4 -2.4 -1.7 -2.1 -2.9 -3.0 -2.9 -3.7 -5.2 -3.6 -1.4 -1.0 .1 .0 -.6 -1.3 -3.7 -1.8 -1.8 -2.3 -1.9 -2.2 -1.2 -.7 -.6 -1.3 -3.5 -5.7 -6.5
-4.1 -4.2 -4.8 -5.7 -4.6 -5.1 -6.6 -5.6 -4.7 -2.9 -2.8 -4.6 -6.3 -6.6 -4.9 -6.1 -6.3 -4.5 -3.3 -1.9 -2.4 -3.0 -3.5 -2.4 -2.4 -2.5 -2.6 -2.6 -3.3 -3.4 -3.4 -2.3 -2.3 -4.0 -3.6 -4.5
-5.0 -4.5 -4.2 -4.9 -4.2 -4.3 -5.0 -5.0 -4.4 -4.7 -4.8 -4.8 -4.3 -4.6 -4.4 -4.7 -4.3 -5.4 -6.2 -5.7 -4.6 -3.8 -4.4 -4.1 -3.6 -3.5 -3.8 -4.4 -4.8 -5.0 -5.1 -4.4 -3.8 -3.1 -3.1 -4.0
-4.1 -3.6 -3.7 -3.8 -4.4 -3.7 -3.8 -3.9 -4.1 -3.4 -4.8 -4.5 -4.1 -3.8 -3.5 -3.2 -3.4 -3.9 -4.3 -4.8 -4.6 -4.4 -4.3 -4.6 -4.3 -4.2 -4.4 -4.1 -4.1 -4.7 -5.1 -4.6 -4.8 -4.2 -4.4 -4.4
-2.8 -3.2 -3.8 -4.0 -4.4 -4.1 -3.9 -3.7 -4.2 -3.6 -3.7 -3.7 -3.8 -2.9 -2.5 -2.4 -2.4 -3.8 -4.6 -4.6 -4.9 -4.4 -4.1 -3.6 -3.3 -3.6 -3.6 -3.3 -2.0 -2.7 -3.0 -2.6 -2.6 -2.6 -2.9 -2.7
-2.5 -3.3 -4.2 -4.4 -4.3 -3.8 -3.5 -4.0 -4.6 -3.0 -2.7 -2.3 -2.4 -2.2 -2.3 -2.1 -2.6 -2.4 -2.9 -2.6 -2.5 -1.5 -.8 .0 -.2 -.4 -.3 -.1 .0 -.1 .1 .2 -.3 -1.0 -2.2 -2.3
-2.7 -2.9 -3.5 -3.2 -2.7 -2.7 -2.9 -2.6 -1.2 -.6 -1.2 -1.6 -1.5 -1.2 -1.0 -.7 -.6 -.4 -.2 .1 .4 .5 .6 .4 .6 .2 .8 -.9 -.1 .2 -.4 -.5 -1.6 -1.9 -2.5 -2.7

Figure 44. ATOVS SD O-B brightness temperature differences (deg C). MAY 2003
Channel: HIRS15 (700 hPa)
NOAA16, using all observations

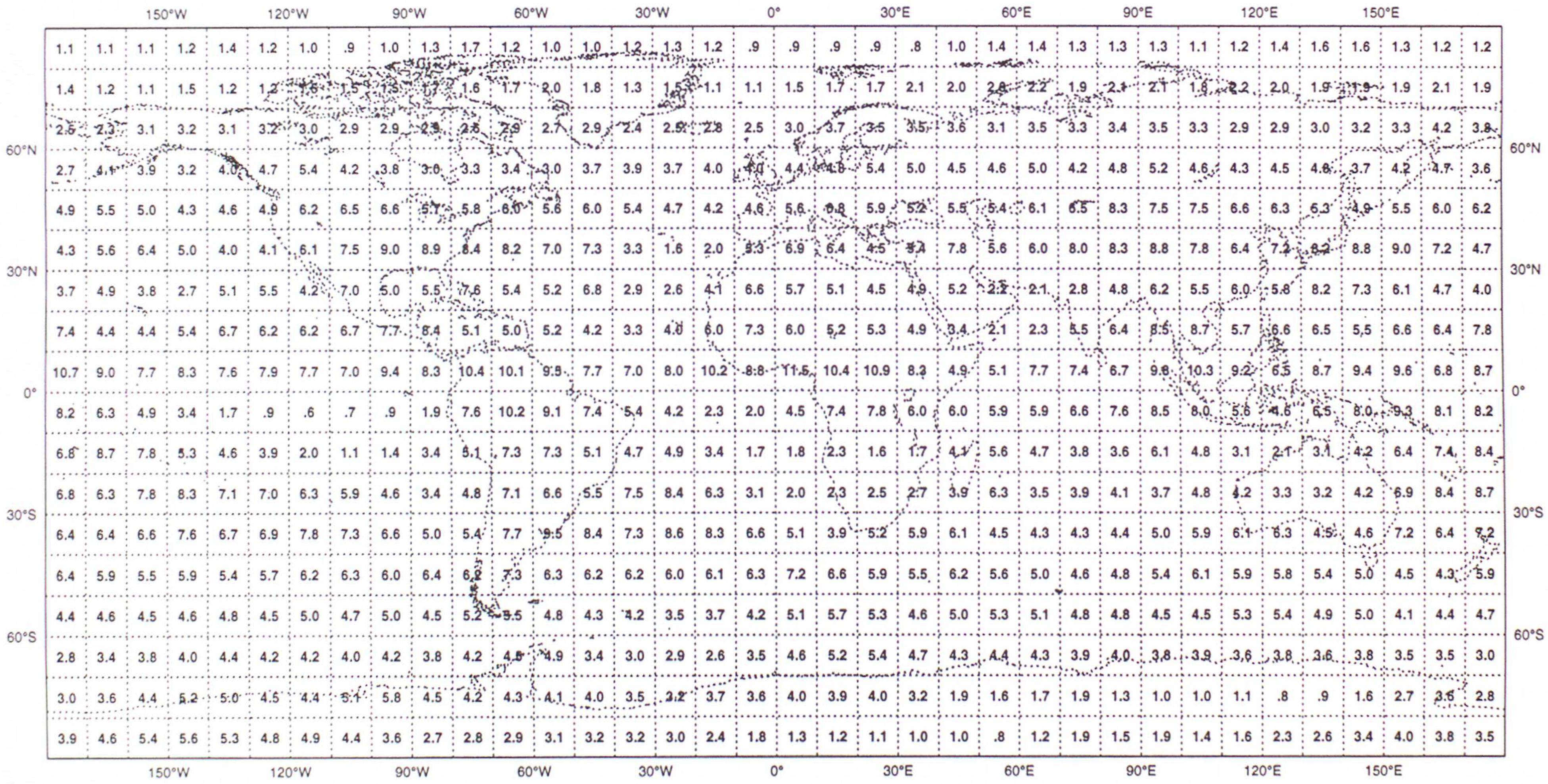

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
1.1 1.1 1.1 1.2 1.4 1.2 1.0 .9 1.0 1.3 1.7 1.2 1.0 1.0 1.2 1.3 1.2 .9 .9 .9 .9 .8 1.0 1.4 1.4 1.3 1.3 1.3 1.1 1.2 1.4 1.6 1.6 1.3 1.2 1.2
1.4 1.2 1.1 1.5 1.2 1.2 1.6 1.5 1.5 1.7 1.6 1.7 2.0 1.8 1.3 1.5 1.1 1.1 1.5 1.7 1.7 2.1 2.0 2.8 2.2 1.9 2.1 2.1 1.8 2.2 2.0 1.9 1.9 1.9 2.1 1.9
2.5 2.3 3.1 3.2 3.1 3.2 3.0 2.9 2.9 2.3 2.6 2.9 2.7 2.9 2.4 2.9 2.8 2.5 3.0 3.7 3.5 3.5 3.6 3.1 3.5 3.3 3.4 3.5 3.3 2.9 2.9 3.0 3.2 3.3 4.2 3.8
2.7 4.1 3.9 3.2 4.0 4.7 5.4 4.2 3.8 3.0 3.3 3.4 3.0 3.7 3.9 3.7 4.0 4.0 4.4 4.8 5.4 5.0 4.5 4.6 5.0 4.2 4.8 5.2 4.6 4.3 4.5 4.8 3.7 4.2 4.7 3.6
4.9 5.5 5.0 4.3 4.6 4.9 6.2 6.5 6.6 5.7 5.8 6.0 5.6 6.0 5.4 4.7 4.2 4.6 5.6 6.8 5.9 5.2 5.5 5.4 6.1 6.5 8.3 7.5 7.5 6.6 6.3 6.3 4.9 5.5 6.0 6.2
4.3 5.6 6.4 5.0 4.0 4.1 6.1 7.5 9.0 8.9 8.4 8.2 7.0 7.3 3.3 1.6 2.0 5.3 6.9 6.4 4.5 5.4 7.8 5.6 6.0 8.0 8.3 8.8 7.8 6.4 7.2 8.2 8.8 9.0 7.2 4.7
3.7 4.9 3.8 2.7 5.1 5.5 4.2 7.0 5.0 5.5 7.6 5.4 5.2 6.8 2.9 2.6 4.1 6.6 5.7 5.1 4.5 4.9 5.2 2.2 2.1 2.8 4.8 6.2 5.5 6.0 5.8 8.2 7.3 6.1 4.7 4.0
7.4 4.4 4.4 5.4 6.7 6.2 6.2 6.7 7.7 8.4 5.1 5.0 5.2 4.2 3.3 4.0 6.0 7.3 6.0 5.2 5.3 4.9 3.4 2.1 2.3 5.5 6.4 8.5 8.7 5.7 6.6 6.5 5.5 6.6 6.4 7.8
10.7 9.0 7.7 8.3 7.6 7.9 7.7 7.0 9.4 8.3 10.4 10.1 9.5 7.7 7.0 8.0 10.2 8.8 11.5 10.4 10.9 8.3 4.9 5.1 7.7 7.4 6.7 9.8 10.3 9.2 6.5 8.7 9.4 9.6 6.8 8.7
8.2 6.3 4.9 3.4 1.7 .9 .6 .7 .9 1.9 7.6 10.2 9.1 7.4 5.4 4.2 2.3 2.0 4.5 7.4 7.8 6.0 6.0 5.9 5.9 6.6 7.6 8.5 8.0 5.6 4.6 6.5 8.0 9.3 8.1 8.2
6.8 8.7 7.8 5.3 4.6 3.9 2.0 1.1 1.4 3.4 5.1 7.3 7.3 5.1 4.7 4.9 3.4 1.7 1.8 2.3 1.6 1.7 4.1 5.6 4.7 3.8 3.6 6.1 4.8 3.1 2.1 3.1 4.2 6.4 7.4 8.4
6.8 6.3 7.8 8.3 7.1 7.0 6.3 5.9 4.6 3.4 4.8 7.1 6.6 5.5 7.5 8.4 6.3 3.1 2.0 2.3 2.5 2.7 3.9 6.3 3.5 3.9 4.1 3.7 4.8 4.2 3.3 3.2 4.2 6.9 8.4 8.7
6.4 6.4 6.6 7.6 6.7 6.9 7.8 7.3 6.6 5.0 5.4 7.7 9.5 8.4 7.3 8.6 8.3 6.6 5.1 3.9 5.2 5.9 6.1 4.5 4.3 4.3 4.4 5.0 5.9 6.1 6.3 4.5 4.6 7.2 6.4 7.2
6.4 5.9 5.5 5.9 5.4 5.7 6.2 6.3 6.0 6.4 6.2 7.3 6.3 6.2 6.2 6.0 6.1 6.3 7.2 6.6 5.9 5.5 6.2 5.6 5.0 4.6 4.8 5.4 6.1 5.9 5.8 5.4 5.0 4.5 4.3 5.9
4.4 4.6 4.5 4.6 4.8 4.5 5.0 4.7 5.0 4.5 5.2 5.5 4.8 4.3 4.2 3.5 3.7 4.2 5.1 5.7 5.3 4.6 5.0 5.3 5.1 4.8 4.8 4.5 4.5 5.3 5.4 4.9 5.0 4.1 4.4 4.7
2.8 3.4 3.8 4.0 4.4 4.2 4.2 4.0 4.2 3.8 4.2 4.5 4.9 3.4 3.0 2.9 2.6 3.5 4.6 5.2 5.4 4.7 4.3 4.4 4.3 3.9 4.0 3.8 3.9 3.6 3.8 3.6 3.8 3.5 3.5 3.0
3.0 3.6 4.4 5.2 5.0 4.5 4.4 5.1 5.8 4.5 4.2 4.3 4.1 4.0 3.5 3.2 3.7 3.6 4.0 3.9 4.0 3.2 1.9 1.6 1.7 1.9 1.3 1.0 1.0 1.1 .8 .9 1.6 2.7 3.5 2.8
3.9 4.6 5.4 5.6 5.3 4.8 4.9 4.4 3.6 2.7 2.8 2.9 3.1 3.2 3.2 3.0 2.4 1.8 1.3 1.2 1.1 1.0 1.0 .8 1.2 1.9 1.5 1.9 1.4 1.6 2.3 2.6 3.4 4.0 3.8 3.5

Figure 45. ATOVS MEAN O-B brightness temperature differences (deg C). MAY 2003
Channel: HIRS11 (500 - 700 hPa)
NOAA16, using all observations

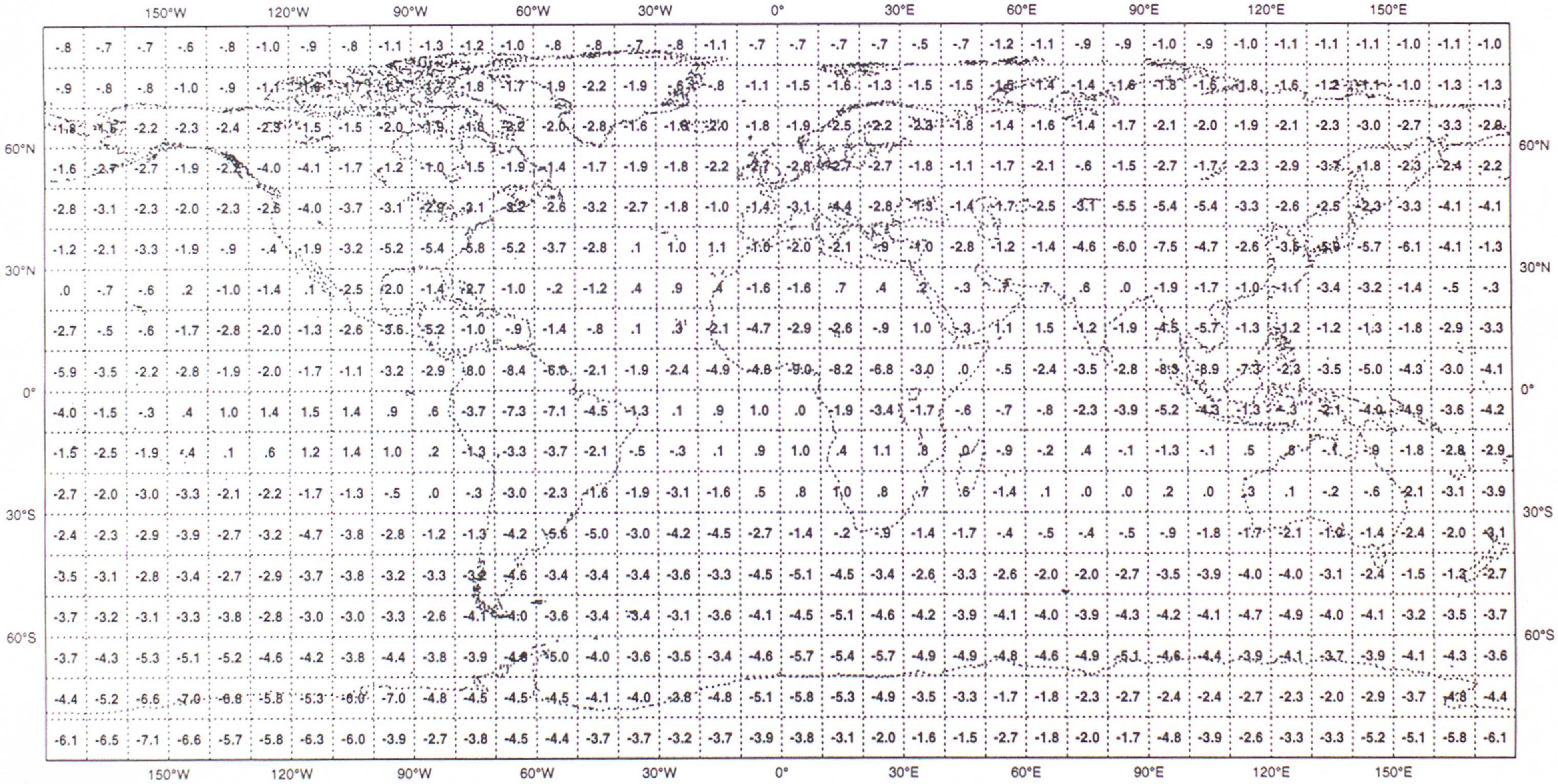
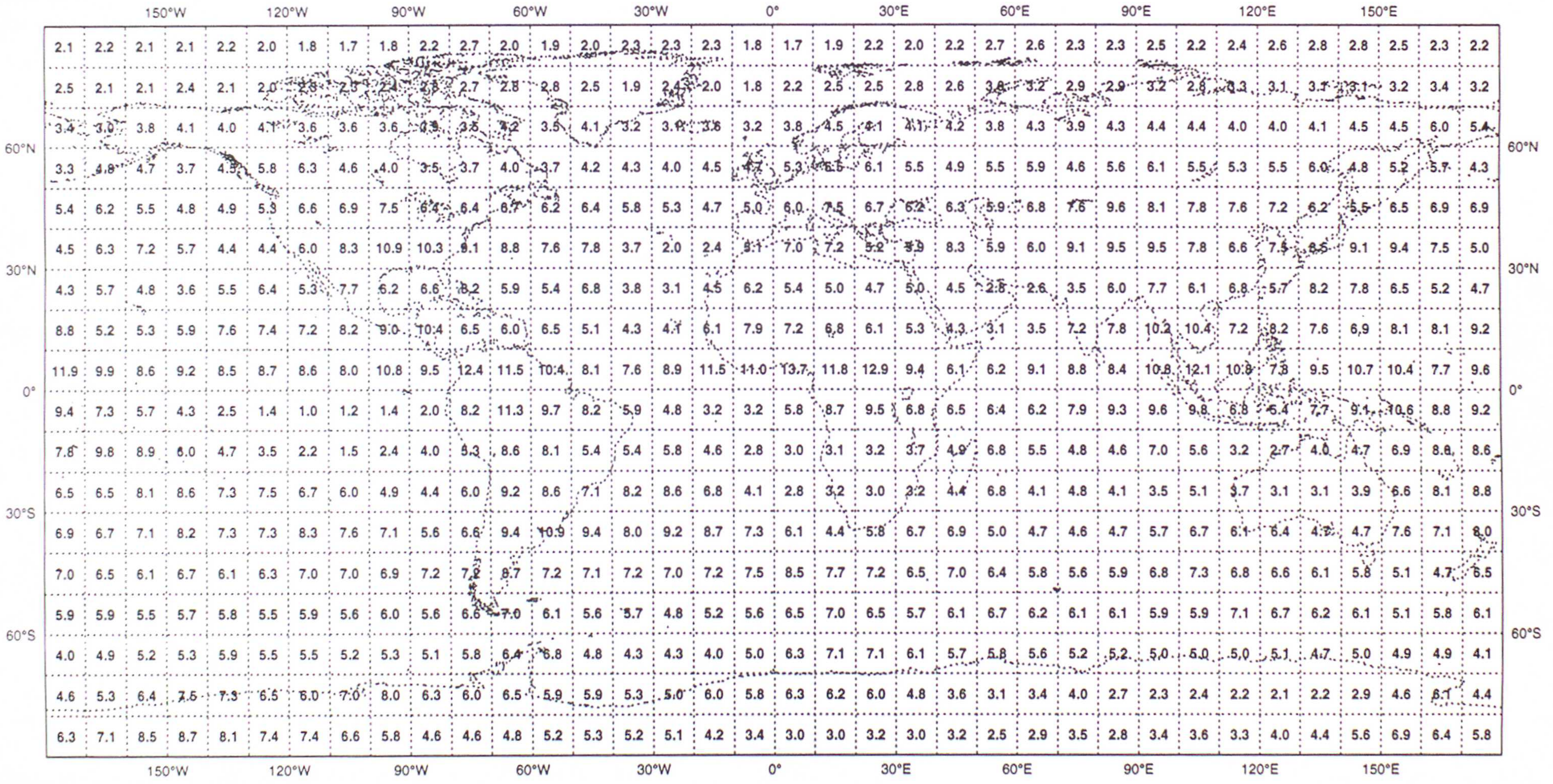

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
-.8 -.7 -.7 -.6 -.8 -1.0 -.9 -.8 -1.1 -1.3 -1.2 -1.0 -.8 -.8 -.7 -.8 -1.1 -.7 -.7 -.7 -.7 -.5 -.7 -1.2 -1.1 -.9 -.9 -1.0 -.9 -1.0 -1.1 -1.1 -1.1 -1.0 -1.1 -1.0
-.9 -.8 -.8 -1.0 -.9 -1.1 -1.6 -1.7 -1.7 -1.7 -1.8 -1.7 -1.9 -2.2 -1.9 -.6 -.8 -1.1 -1.5 -1.6 -1.3 -1.5 -1.5 -1.6 -1.4 -1.4 -1.6 -1.8 -1.6 -1.8 -1.6 -1.2 -1.1 -1.0 -1.3 -1.3
-1.8 -1.6 -2.2 -2.3 -2.4 -2.3 -1.5 -1.5 -2.0 -1.9 -1.8 -2.2 -2.0 -2.8 -1.6 -1.8 -2.0 -1.8 -1.9 -2.5 -2.2 -2.3 -1.8 -1.4 -1.6 -1.4 -1.7 -2.1 -2.0 -1.9 -2.1 -2.3 -3.0 -2.7 -3.3 -2.8
-1.6 -2.7 -2.7 -1.9 -2.2 -4.0 -4.1 -1.7 -1.2 -1.0 -1.5 -1.9 -1.4 -1.7 -1.9 -1.8 -2.2 -2.7 -2.8 -2.7 -2.7 -1.8 -1.1 -1.7 -2.1 -.6 -1.5 -2.7 -1.7 -2.3 -2.9 -3.7 -1.8 -2.3 -2.4 -2.2
-2.8 -3.1 -2.3 -2.0 -2.3 -2.6 -4.0 -3.7 -3.1 -2.9 -3.1 -3.2 -2.6 -3.2 -2.7 -1.8 -1.0 -1.4 -3.1 -4.4 -2.8 -1.3 -1.4 -1.7 -2.5 -3.1 -5.5 -5.4 -5.4 -3.3 -2.6 -2.5 -2.3 -3.3 -4.1 -4.1
-1.2 -2.1 -3.3 -1.9 -.9 -.4 -1.9 -3.2 -5.2 -5.4 -5.8 -5.2 -3.7 -2.8 .1 1.0 1.1 -1.6 -2.0 -2.1 -.9 -1.0 -2.8 -1.2 -1.4 -4.6 -6.0 -7.5 -4.7 -2.6 -3.5 -5.0 -5.7 -6.1 -4.1 -1.3
.0 -.7 -.6 .2 -1.0 -1.4 .1 -2.5 2.0 -1.4 -2.7 -1.0 -.2 -1.2 .4 .9 .4 -1.6 -1.6 .7 .4 .2 -.3 .7 .7 .6 .0 -1.9 -1.7 -1.0 -1.1 -3.4 -3.2 -1.4 -.5 -.3
-2.7 -.5 -.6 -1.7 -2.8 -2.0 -1.3 -2.6 -3.6 -5.2 -1.0 -.9 -1.4 -.8 .1 .3 -2.1 -4.7 -2.9 -2.6 -.9 1.0 -.3 1.1 1.5 -1.2 -1.9 -4.5 -5.7 -1.3 -1.2 -1.2 -1.3 -1.8 -2.9 -3.3
-5.9 -3.5 -2.2 -2.8 -1.9 -2.0 -1.7 -1.1 -3.2 -2.9 -8.0 -8.4 -6.0 -2.1 -1.9 -2.4 -4.9 -4.8 -9.0 -8.2 -6.8 -3.0 .0 -.5 -2.4 -3.5 -2.8 -8.3 -8.9 -7.3 -2.3 -3.5 -5.0 -4.3 -3.0 -4.1
-4.0 -1.5 -.3 .4 1.0 1.4 1.5 1.4 .9 .6 -3.7 -7.3 -7.1 -4.5 -1.3 .1 .9 1.0 .0 -1.9 -3.4 -1.7 -.6 -.7 -.8 -2.3 -3.9 -5.2 -4.3 -1.3 -.3 -2.1 -4.0 -4.9 -3.6 -4.2
-1.5 -2.5 -1.9 .4 .1 .6 1.2 1.4 1.0 .2 -1.3 -3.3 -3.7 -2.1 -.5 -.3 .1 .9 1.0 .4 1.1 .8 .0 -.9 -.2 .4 -.1 -1.3 -.1 .5 .8 -.1 -.9 -1.8 -2.8 -2.9
-2.7 -2.0 -3.0 -3.3 -2.1 -2.2 -1.7 -1.3 -.5 .0 -.3 -3.0 -2.3 -1.6 -1.9 -3.1 -1.6 .5 .8 1.0 .8 .7 .6 -1.4 .1 .0 .0 .2 .0 .3 .1 -.2 -.6 -2.1 -3.1 -3.9
-2.4 -2.3 -2.9 -3.9 -2.7 -3.2 -4.7 -3.8 -2.8 -1.2 -1.3 -4.2 -5.6 -5.0 -3.0 -4.2 -4.5 -2.7 -1.4 -.2 -.9 -1.4 -1.7 -.4 -.5 -.4 -.5 -.9 -1.8 -1.7 -2.1 -1.0 -1.4 -2.4 -2.0 -3.1
-3.5 -3.1 -2.8 -3.4 -2.7 -2.9 -3.7 -3.8 -3.2 -3.3 -3.2 -4.6 -3.4 -3.4 -3.4 -3.6 -3.3 -4.5 -5.1 -4.5 -3.4 -2.6 -3.3 -2.6 -2.0 -2.0 -2.7 -3.5 -3.9 -4.0 -4.0 -3.1 -2.4 -1.5 -1.3 -2.7
-3.7 -3.2 -3.1 -3.3 -3.8 -2.8 -3.0 -3.0 -3.3 -2.6 -4.1 -4.0 -3.6 -3.4 -3.4 -3.1 -3.6 -4.1 -4.5 -5.1 -4.6 -4.2 -3.9 -4.1 -4.0 -3.9 -4.3 -4.2 -4.1 -4.7 -4.9 -4.0 -4.1 -3.2 -3.5 -3.7
-3.7 -4.3 -5.3 -5.1 -5.2 -4.6 -4.2 -3.8 -4.4 -3.8 -3.9 -4.8 -5.0 -4.0 -3.6 -3.5 -3.4 -4.6 -5.7 -5.4 -5.7 -4.9 -4.9 -4.8 -4.6 -4.9 -5.1 -4.6 -4.4 -3.9 -4.1 -3.7 -3.9 -4.1 -4.3 -3.6
-4.4 -5.2 -6.6 -7.0 -6.8 -5.8 -5.3 -6.0 -7.0 -4.8 -4.5 -4.5 -4.5 -4.1 -4.0 -3.8 -4.8 -5.1 -5.8 -5.3 -4.9 -3.5 -3.3 -1.7 -1.8 -2.3 -2.7 -2.4 -2.4 -2.7 -2.3 -2.0 -2.9 -3.7 -4.8 -4.4
-6.1 -6.5 -7.1 -6.6 -5.7 -5.8 -6.3 -6.0 -3.9 -2.7 -3.8 -4.5 -4.4 -3.7 -3.7 -3.2 -3.7 -3.9 -3.8 -3.1 -2.0 -1.6 -1.5 -2.7 -1.8 -2.0 -1.7 -4.8 -3.9 -2.6 -3.3 -3.3 -5.2 -5.1 -5.8 -6.1

Figure 46. ATOVS SD O-B brightness temperature differences (deg C). MAY 2003
Channel: HIRS11 (500 - 700 hPa)
NOAA16, using all observations



2.1	2.2	2.1	2.1	2.2	2.0	1.8	1.7	1.8	2.2	2.7	2.0	1.9	2.0	2.3	2.3	2.3	1.8	1.7	1.9	2.2	2.0	2.2	2.7	2.6	2.3	2.3	2.5	2.2	2.4	2.6	2.8	2.8	2.5	2.3	2.2
2.5	2.1	2.1	2.4	2.1	2.0	2.8	2.3	2.4	2.3	2.7	2.8	2.8	2.5	1.9	2.4	2.0	1.8	2.2	2.5	2.5	2.8	2.6	3.8	3.2	2.9	2.9	3.2	2.8	3.3	3.1	3.1	3.1	3.2	3.4	3.2
3.4	3.0	3.8	4.1	4.0	4.1	3.6	3.6	3.6	3.9	3.5	4.2	3.5	4.1	3.2	3.1	3.6	3.2	3.8	4.5	4.1	4.1	4.2	3.8	4.3	3.9	4.3	4.4	4.4	4.0	4.0	4.1	4.5	4.5	6.0	5.4
3.3	4.8	4.7	3.7	4.5	5.8	6.3	4.6	4.0	3.5	3.7	4.0	3.7	4.2	4.3	4.0	4.5	4.7	5.3	6.5	6.1	5.5	4.9	5.5	5.9	4.6	5.6	6.1	5.5	5.3	5.5	6.0	4.8	5.2	5.7	4.3
5.4	6.2	5.5	4.8	4.9	5.3	6.6	6.9	7.5	6.4	6.4	6.7	6.2	6.4	5.8	5.3	4.7	5.0	6.0	7.5	6.7	6.2	6.3	5.9	6.8	7.6	9.6	8.1	7.8	7.6	7.2	6.2	5.5	6.5	6.9	6.9
4.5	6.3	7.2	5.7	4.4	4.4	6.0	8.3	10.9	10.3	9.1	8.8	7.6	7.8	3.7	2.0	2.4	9.1	7.0	7.2	5.2	5.9	8.3	5.9	6.0	9.1	9.5	9.5	7.8	6.6	7.5	8.5	9.1	9.4	7.5	5.0
4.3	5.7	4.8	3.6	5.5	6.4	5.3	7.7	6.2	6.6	8.2	5.9	5.4	6.8	3.8	3.1	4.5	6.2	5.4	5.0	4.7	5.0	4.5	2.8	2.6	3.5	6.0	7.7	6.1	6.8	5.7	8.2	7.8	6.5	5.2	4.7
8.8	5.2	5.3	5.9	7.6	7.4	7.2	8.2	9.0	10.4	6.5	6.0	6.5	5.1	4.3	4.1	6.1	7.9	7.2	6.8	6.1	5.3	4.3	3.1	3.5	7.2	7.8	10.2	10.4	7.2	8.2	7.6	6.9	8.1	8.1	9.2
11.9	9.9	8.6	9.2	8.5	8.7	8.6	8.0	10.8	9.5	12.4	11.5	10.4	8.1	7.6	8.9	11.5	11.0	13.7	11.8	12.9	9.4	6.1	6.2	9.1	8.8	8.4	10.8	12.1	10.8	7.3	9.5	10.7	10.4	7.7	9.6
9.4	7.3	5.7	4.3	2.5	1.4	1.0	1.2	1.4	2.0	8.2	11.3	9.7	8.2	5.9	4.8	3.2	3.2	5.8	8.7	9.5	6.8	6.5	6.4	6.2	7.9	9.3	9.6	9.8	6.8	5.4	7.7	9.1	10.6	8.8	9.2
7.8	9.8	8.9	6.0	4.7	3.5	2.2	1.5	2.4	4.0	5.3	8.6	8.1	5.4	5.4	5.8	4.6	2.8	3.0	3.1	3.2	3.7	4.9	6.8	5.5	4.8	4.6	7.0	5.6	3.2	2.7	4.0	4.7	6.9	8.8	8.6
6.5	6.5	8.1	8.6	7.3	7.5	6.7	6.0	4.9	4.4	6.0	9.2	8.6	7.1	8.2	8.6	6.8	4.1	2.8	3.2	3.0	3.2	4.4	6.8	4.1	4.8	4.1	3.5	5.1	3.7	3.1	3.1	3.9	6.6	8.1	8.8
6.9	6.7	7.1	8.2	7.3	7.3	8.3	7.6	7.1	5.6	6.6	9.4	10.9	9.4	8.0	9.2	8.7	7.3	6.1	4.4	5.8	6.7	6.9	5.0	4.7	4.6	4.7	5.7	6.7	6.1	6.4	4.7	4.7	7.6	7.1	8.0
7.0	6.5	6.1	6.7	6.1	6.3	7.0	7.0	6.9	7.2	7.2	8.7	7.2	7.1	7.2	7.0	7.2	7.5	8.5	7.7	7.2	6.5	7.0	6.4	5.8	5.6	5.9	6.8	7.3	6.8	6.6	6.1	5.8	5.1	4.7	6.5
5.9	5.9	5.5	5.7	5.8	5.5	5.9	5.6	6.0	5.6	6.6	7.0	6.1	5.6	5.7	4.8	5.2	5.6	6.5	7.0	6.5	5.7	6.1	6.7	6.2	6.1	6.1	5.9	5.9	7.1	6.7	6.2	6.1	5.1	5.8	6.1
4.0	4.9	5.2	5.3	5.9	5.5	5.5	5.2	5.3	5.1	5.8	6.4	6.8	4.8	4.3	4.3	4.0	5.0	6.3	7.1	7.1	6.1	5.7	5.8	5.6	5.2	5.2	5.0	5.0	5.0	5.1	4.7	5.0	4.9	4.9	4.1
4.6	5.3	6.4	7.5	7.3	6.5	6.0	7.0	8.0	6.3	6.0	6.5	5.9	5.9	5.3	5.0	6.0	5.8	6.3	6.2	6.0	4.8	3.6	3.1	3.4	4.0	2.7	2.3	2.4	2.2	2.1	2.2	2.9	4.6	6.1	4.4
6.3	7.1	8.5	8.7	8.1	7.4	7.4	6.6	5.8	4.6	4.6	4.8	5.2	5.3	5.2	5.1	4.2	3.4	3.0	3.0	3.2	3.0	3.2	2.5	2.9	3.5	2.8	3.4	3.6	3.3	4.0	4.4	5.6	6.9	6.4	5.8

Figure 47. ATOVS MEAN O-B brightness temperature differences (deg C). MAY 2003
Channel: HIRS4 (400 hPa)
NOAA16, using all observations

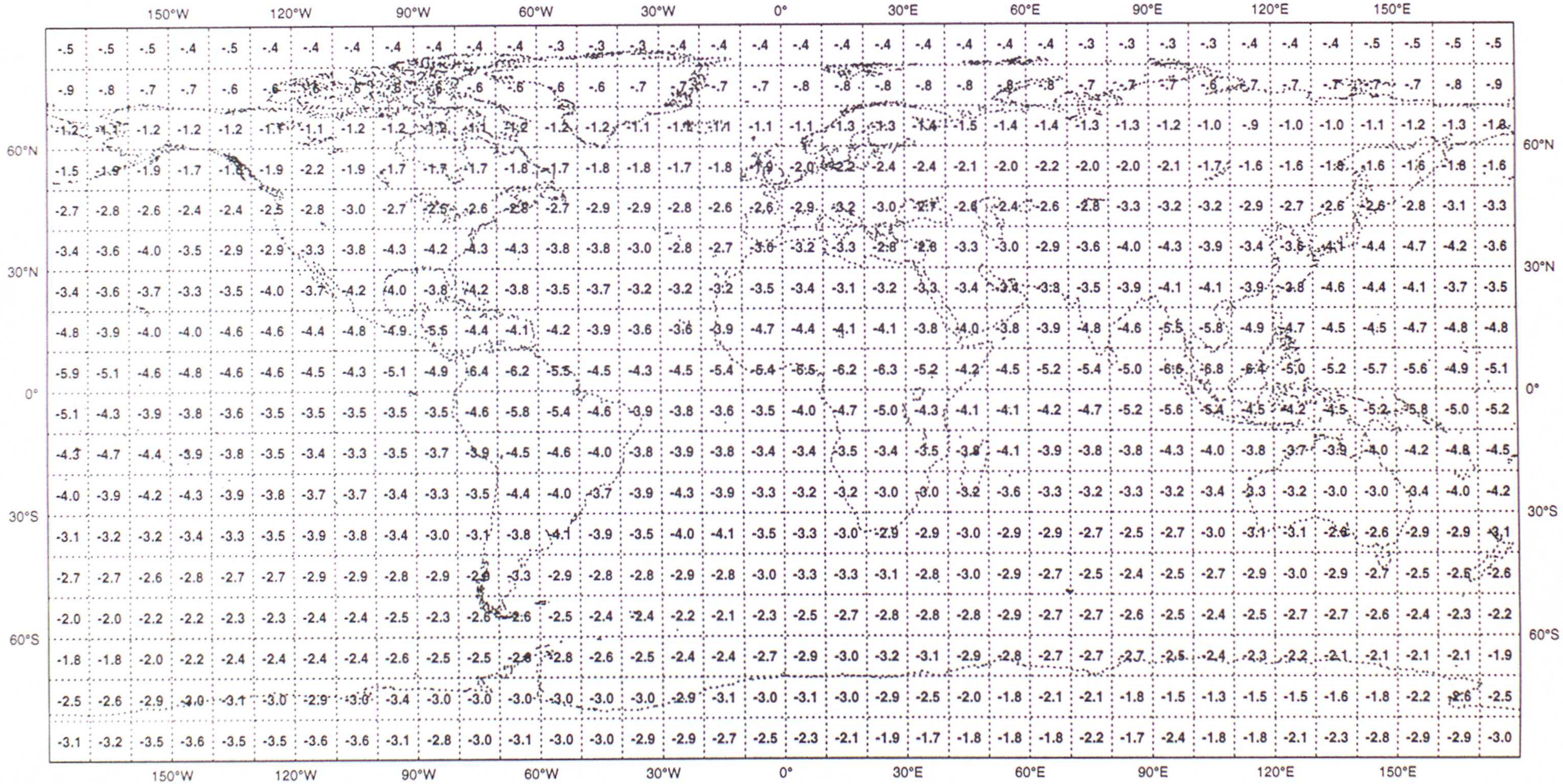

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
-.5 -.5 -.5 -.4 -.5 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.3 -.3 -.3 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.3 -.3 -.3 -.3 -.4 -.4 -.4 -.5 -.5 -.5 -.5
-.9 -.8 -.7 -.7 -.6 -.6 -.6 -.6 -.6 -.6 -.6 -.6 -.6 -.6 -.7 -.7 -.7 -.7 -.8 -.8 -.8 -.8 -.8 -.8 -.8 -.7 -.7 -.7 -.6 -.7 -.7 -.7 -.7 -.7 -.8 -.9
-1.2 -1.1 -1.2 -1.2 -1.2 -1.1 -1.1 -1.2 -1.2 -1.2 -1.1 -1.2 -1.2 -1.2 -1.1 -1.1 -1.1 -1.1 -1.1 -1.3 -1.3 -1.4 -1.5 -1.4 -1.4 -1.3 -1.3 -1.2 -1.0 -.9 -1.0 -1.0 -1.1 -1.2 -1.3 -1.8
-1.5 -1.9 -1.9 -1.7 -1.8 -1.9 -2.2 -1.9 -1.7 -1.7 -1.7 -1.8 -1.7 -1.8 -1.8 -1.7 -1.8 -1.9 -2.0 -2.2 -2.4 -2.4 -2.1 -2.0 -2.2 -2.0 -2.0 -2.1 -1.7 -1.6 -1.6 -1.8 -1.6 -1.6 -1.8 -1.6
-2.7 -2.8 -2.6 -2.4 -2.4 -2.5 -2.8 -3.0 -2.7 -2.5 -2.6 -2.8 -2.7 -2.9 -2.9 -2.8 -2.6 -2.6 -2.9 -3.2 -3.0 -2.7 -2.6 -2.4 -2.6 -2.8 -3.3 -3.2 -3.2 -2.9 -2.7 -2.6 -2.6 -2.8 -3.1 -3.3
-3.4 -3.6 -4.0 -3.5 -2.9 -2.9 -3.3 -3.8 -4.3 -4.2 -4.3 -4.3 -3.8 -3.8 -3.0 -2.8 -2.7 -3.0 -3.2 -3.3 -2.8 -2.8 -3.3 -3.0 -2.9 -3.6 -4.0 -4.3 -3.9 -3.4 -3.5 -4.1 -4.4 -4.7 -4.2 -3.6
-3.4 -3.6 -3.7 -3.3 -3.5 -4.0 -3.7 -4.2 -4.0 -3.8 -4.2 -3.8 -3.5 -3.7 -3.2 -3.2 -3.2 -3.5 -3.4 -3.1 -3.2 -3.3 -3.4 -3.4 -3.8 -3.5 -3.9 -4.1 -4.1 -3.9 -3.8 -4.6 -4.4 -4.1 -3.7 -3.5
-4.8 -3.9 -4.0 -4.0 -4.6 -4.6 -4.4 -4.8 -4.9 -5.5 -4.4 -4.1 -4.2 -3.9 -3.6 -3.6 -3.9 -4.7 -4.4 -4.1 -4.1 -3.8 -4.0 -3.8 -3.9 -4.8 -4.6 -5.5 -5.8 -4.9 -4.7 -4.5 -4.5 -4.7 -4.8 -4.8
-5.9 -5.1 -4.6 -4.8 -4.6 -4.6 -4.5 -4.3 -5.1 -4.9 -6.4 -6.2 -5.5 -4.5 -4.3 -4.5 -5.4 -6.4 -6.5 -6.2 -6.3 -5.2 -4.2 -4.5 -5.2 -5.4 -5.0 -6.6 -6.8 -6.4 -5.0 -5.2 -5.7 -5.6 -4.9 -5.1
-5.1 -4.3 -3.9 -3.8 -3.6 -3.5 -3.5 -3.5 -3.5 -3.5 -4.6 -5.8 -5.4 -4.6 -3.9 -3.8 -3.6 -3.5 -4.0 -4.7 -5.0 -4.3 -4.1 -4.1 -4.2 -4.7 -5.2 -5.6 -5.4 -4.5 -4.2 -4.5 -5.2 -5.8 -5.0 -5.2
-4.3 -4.7 -4.4 -3.9 -3.8 -3.5 -3.4 -3.3 -3.5 -3.7 -3.9 -4.5 -4.6 -4.0 -3.8 -3.9 -3.8 -3.4 -3.4 -3.5 -3.4 -3.5 -3.8 -4.1 -3.9 -3.8 -3.8 -4.3 -4.0 -3.8 -3.7 -3.9 -4.0 -4.2 -4.8 -4.5
-4.0 -3.9 -4.2 -4.3 -3.9 -3.8 -3.7 -3.7 -3.4 -3.3 -3.5 -4.4 -4.0 -3.7 -3.9 -4.3 -3.9 -3.3 -3.2 -3.2 -3.0 -3.0 -3.2 -3.6 -3.3 -3.2 -3.3 -3.2 -3.4 -3.3 -3.2 -3.0 -3.0 -3.4 -4.0 -4.2
-3.1 -3.2 -3.2 -3.4 -3.3 -3.5 -3.9 -3.8 -3.4 -3.0 -3.1 -3.8 -4.1 -3.9 -3.5 -4.0 -4.1 -3.5 -3.3 -3.0 -2.9 -2.9 -3.0 -2.9 -2.9 -2.7 -2.5 -2.7 -3.0 -3.1 -3.1 -2.6 -2.6 -2.9 -2.9 -3.1
-2.7 -2.7 -2.6 -2.8 -2.7 -2.7 -2.9 -2.9 -2.8 -2.9 -2.9 -3.3 -2.9 -2.8 -2.8 -2.9 -2.8 -3.0 -3.3 -3.3 -3.1 -2.8 -3.0 -2.9 -2.7 -2.5 -2.4 -2.5 -2.7 -2.9 -3.0 -2.9 -2.7 -2.5 -2.5 -2.6
-2.0 -2.0 -2.2 -2.2 -2.3 -2.3 -2.4 -2.4 -2.5 -2.3 -2.6 -2.6 -2.5 -2.4 -2.4 -2.2 -2.1 -2.3 -2.5 -2.7 -2.8 -2.8 -2.8 -2.9 -2.7 -2.7 -2.6 -2.5 -2.4 -2.5 -2.7 -2.7 -2.6 -2.4 -2.3 -2.2
-1.8 -1.8 -2.0 -2.2 -2.4 -2.4 -2.4 -2.4 -2.6 -2.5 -2.5 -2.8 -2.8 -2.6 -2.5 -2.4 -2.4 -2.7 -2.9 -3.0 -3.2 -3.1 -2.9 -2.8 -2.7 -2.7 -2.7 -2.5 -2.4 -2.3 -2.2 -2.1 -2.1 -2.1 -2.1 -1.9
-2.5 -2.6 -2.9 -3.0 -3.1 -3.0 -2.9 -3.0 -3.4 -3.0 -3.0 -3.0 -3.0 -3.0 -3.0 -2.9 -3.1 -3.0 -3.1 -3.0 -2.9 -2.5 -2.0 -1.8 -2.1 -2.1 -1.8 -1.5 -1.3 -1.5 -1.5 -1.6 -1.8 -2.2 -2.6 -2.5
-3.1 -3.2 -3.5 -3.6 -3.5 -3.5 -3.6 -3.6 -3.1 -2.8 -3.0 -3.1 -3.0 -3.0 -2.9 -2.9 -2.7 -2.5 -2.3 -2.1 -1.9 -1.7 -1.8 -1.8 -1.8 -2.2 -1.7 -2.4 -1.8 -1.8 -2.1 -2.3 -2.8 -2.9 -2.9 -3.0
150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E

Figure 48. ATOVS SD O-B brightness temperature differences (deg C). MAY 2003
Channel: HIRS4 (400 hPa)
NOAA16, using all observations

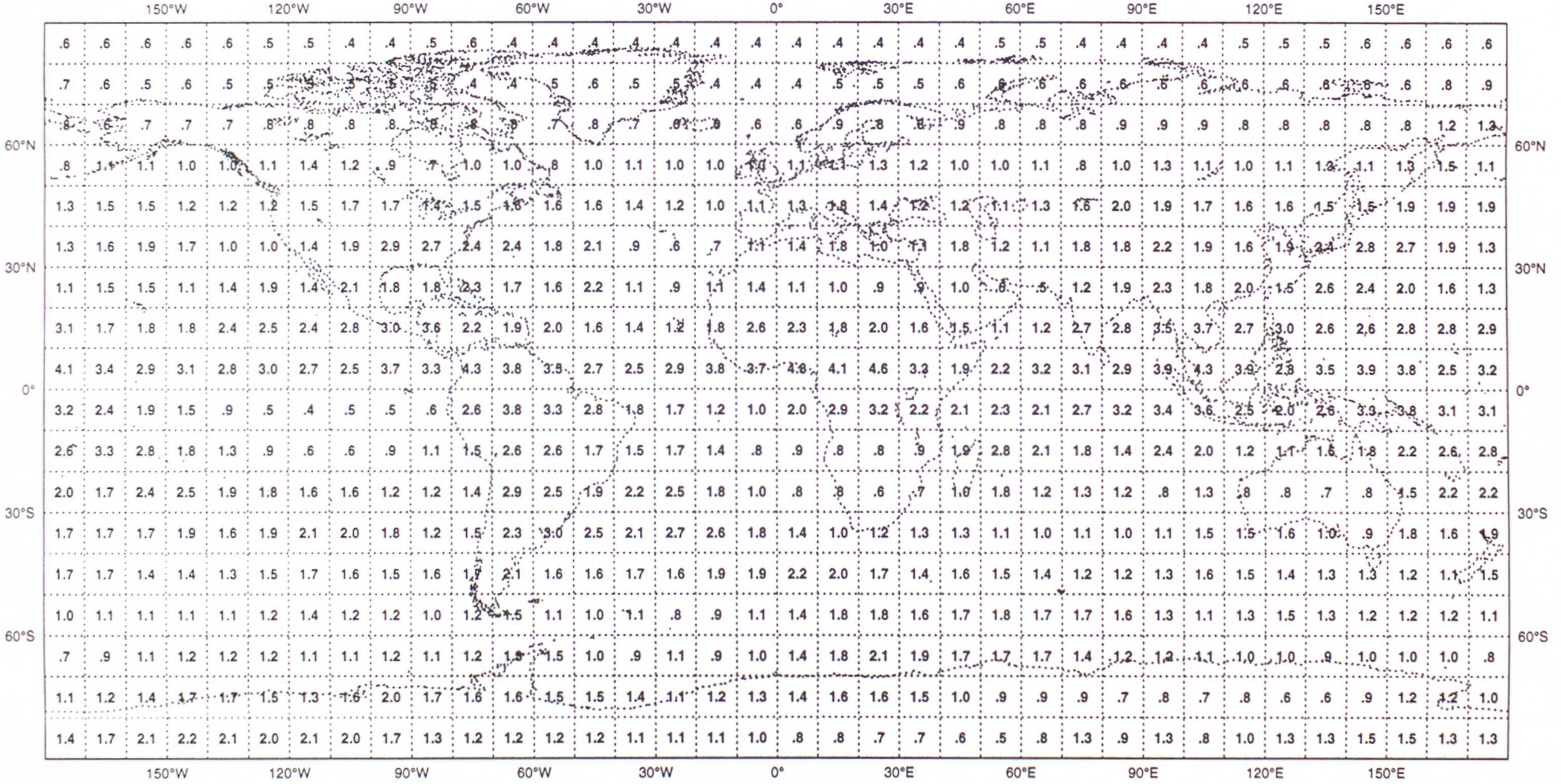

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
.6 .6 .6 .6 .6 .5 .5 .4 .4 .5 .6 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .5 .4 .4 .4 .4 .5 .5 .5 .6 .6 .6 .6
.7 .6 .5 .6 .5 .5 .5 .5 .5 .5 .4 .4 .5 .6 .5 .5 .4 .4 .4 .5 .5 .5 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .8 .9
.8 .6 .7 .7 .7 .8 .8 .8 .8 .8 .8 .8 .7 .8 .7 .6 .9 .6 .6 .9 .8 .8 .9 .8 .8 .8 .9 .9 .9 .8 .8 .8 .8 .8 1.2 1.3
.8 1.1 1.1 1.0 1.0 1.1 1.4 1.2 .9 .7 1.0 1.0 .8 1.0 1.1 1.0 1.0 1.0 1.1 1.1 1.3 1.2 1.0 1.0 1.1 .8 1.0 1.3 1.1 1.0 1.1 1.3 1.1 1.3 1.5 1.1
1.3 1.5 1.5 1.2 1.2 1.2 1.5 1.7 1.7 1.4 1.5 1.6 1.6 1.6 1.4 1.2 1.0 1.1 1.3 1.8 1.4 1.2 1.2 1.1 1.3 1.6 2.0 1.9 1.7 1.6 1.6 1.5 1.5 1.9 1.9 1.9
1.3 1.6 1.9 1.7 1.0 1.0 1.4 1.9 2.9 2.7 2.4 2.4 1.8 2.1 .9 .6 .7 1.1 1.4 1.8 1.0 1.1 1.8 1.2 1.1 1.8 1.8 2.2 1.9 1.6 1.9 2.4 2.8 2.7 1.9 1.3
1.1 1.5 1.5 1.1 1.4 1.9 1.4 2.1 1.8 1.8 2.3 1.7 1.6 2.2 1.1 .9 1.1 1.4 1.1 1.0 .9 .9 1.0 .6 .5 1.2 1.9 2.3 1.8 2.0 1.5 2.6 2.4 2.0 1.6 1.3
3.1 1.7 1.8 1.8 2.4 2.5 2.4 2.8 3.0 3.6 2.2 1.9 2.0 1.6 1.4 1.2 1.8 2.6 2.3 1.8 2.0 1.6 1.5 1.1 1.2 2.7 2.8 3.5 3.7 2.7 3.0 2.6 2.6 2.8 2.8 2.9
4.1 3.4 2.9 3.1 2.8 3.0 2.7 2.5 3.7 3.3 4.3 3.8 3.5 2.7 2.5 2.9 3.8 3.7 4.8 4.1 4.6 3.3 1.9 2.2 3.2 3.1 2.9 3.9 4.3 3.9 2.8 3.5 3.9 3.8 2.5 3.2
3.2 2.4 1.9 1.5 .9 .5 .4 .5 .5 .6 2.6 3.8 3.3 2.8 1.8 1.7 1.2 1.0 2.0 2.9 3.2 2.2 2.1 2.3 2.1 2.7 3.2 3.4 3.6 2.5 2.0 2.6 3.3 3.8 3.1 3.1
2.6 3.3 2.8 1.8 1.3 .9 .6 .6 .9 1.1 1.5 2.6 2.6 1.7 1.5 1.7 1.4 .8 .9 .8 .8 .9 1.9 2.8 2.1 1.8 1.4 2.4 2.0 1.2 1.1 1.6 1.8 2.2 2.6 2.8
2.0 1.7 2.4 2.5 1.9 1.8 1.6 1.6 1.2 1.2 1.4 2.9 2.5 1.9 2.2 2.5 1.8 1.0 .8 .8 .6 .7 1.0 1.8 1.2 1.3 1.2 .8 1.3 .8 .8 .7 .8 1.5 2.2 2.2
1.7 1.7 1.7 1.9 1.6 1.9 2.1 2.0 1.8 1.2 1.5 2.3 3.0 2.5 2.1 2.7 2.6 1.8 1.4 1.0 1.2 1.3 1.3 1.1 1.0 1.1 1.0 1.1 1.5 1.5 1.6 1.0 .9 1.8 1.6 1.9
1.7 1.7 1.4 1.4 1.3 1.5 1.7 1.6 1.5 1.6 1.7 2.1 1.6 1.6 1.7 1.6 1.9 1.9 2.2 2.0 1.7 1.4 1.6 1.5 1.4 1.2 1.2 1.3 1.6 1.5 1.4 1.3 1.3 1.2 1.1 1.5
1.0 1.1 1.1 1.1 1.1 1.2 1.4 1.2 1.2 1.0 1.2 1.5 1.1 1.0 1.1 .8 .9 1.1 1.4 1.8 1.8 1.6 1.7 1.8 1.7 1.7 1.6 1.3 1.1 1.3 1.5 1.3 1.2 1.2 1.2 1.1
.7 .9 1.1 1.2 1.2 1.2 1.1 1.1 1.2 1.1 1.2 1.5 1.5 1.0 .9 1.1 .9 1.0 1.4 1.8 2.1 1.9 1.7 1.7 1.7 1.4 1.2 1.2 1.1 1.0 1.0 .9 1.0 1.0 1.0 .8
1.1 1.2 1.4 1.7 1.7 1.5 1.3 1.6 2.0 1.7 1.6 1.6 1.5 1.5 1.4 1.1 1.2 1.3 1.4 1.6 1.6 1.5 1.0 .9 .9 .9 .7 .8 .7 .8 .6 .6 .9 1.2 1.2 1.0
1.4 1.7 2.1 2.2 2.1 2.0 2.1 2.0 1.7 1.3 1.2 1.2 1.2 1.2 1.1 1.1 1.1 1.0 .8 .8 .7 .7 .6 .5 .8 1.3 .9 1.3 .8 1.0 1.3 1.3 1.5 1.5 1.3 1.3

Figure 49. ATOVS MEAN O-B brightness temperature differences (deg C). MAY 2003
Channel: AMSUA-5 (700 hPa)
NOAA16, using all observations

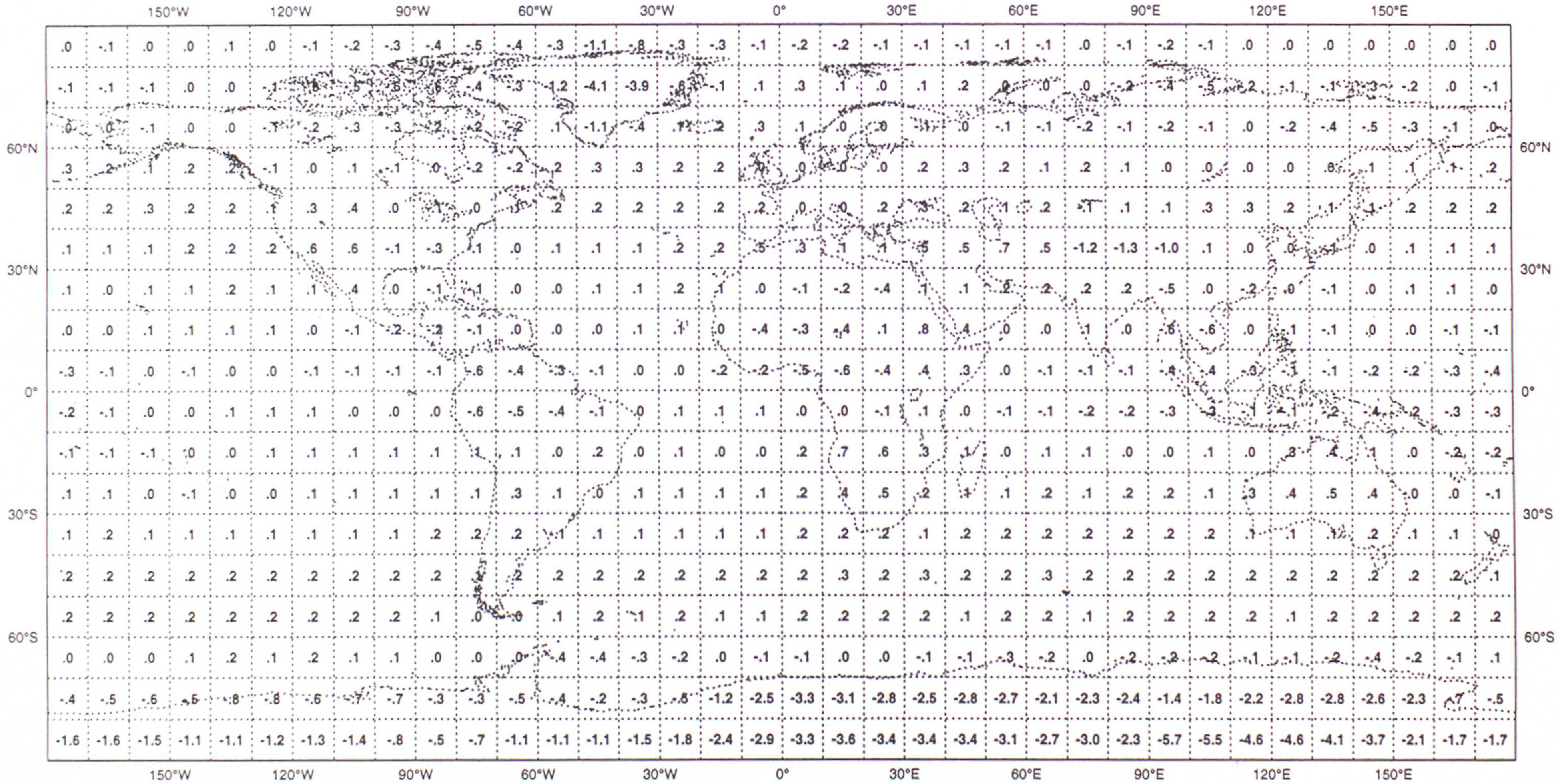

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
.0 -.1 .0 .0 .1 .0 -.1 -.2 -.3 -.4 -.5 -.4 -.3 -1.1 -.8 -.3 -.3 -.1 -.2 -.2 -.1 -.1 -.1 -.1 -.1 .0 -.1 -.2 -.1 .0 .0 .0 .0 .0 .0 .0
-.1 -.1 -.1 .0 .0 -.1 .6 .5 .6 .6 -.4 -.3 -1.2 -4.1 -3.9 -.6 -.1 .1 .3 .1 .0 .1 .2 .0 .0 .0 -.2 -.4 -.5 -.2 -.1 -.1 -.3 -.2 .0 -.1
.0 .0 -.1 .0 .0 -.1 -.2 -.3 -.3 -.2 -.2 -.2 .1 -1.1 -.4 .1 .2 .3 .1 .0 .0 -.1 .0 -.1 -.1 -.2 -.1 -.2 -.1 .0 -.2 -.4 -.5 -.3 -.1 .0
.3 .2 .1 .2 .2 -.1 .0 .1 -.1 .0 -.2 -.2 .2 .3 .3 .2 .2 .0 .0 .0 .0 .2 .3 .2 .1 .2 .1 .0 .0 .0 .0 .6 .1 .1 .1 .2
.2 .2 .3 .2 .2 .1 .3 .4 .0 -.1 .0 .2 .2 .2 .2 .2 .2 .2 .0 .0 .2 .3 .2 .1 .2 .1 .1 .1 .3 .3 .2 .1 .1 .2 .2 .2
.1 .1 .1 .2 .2 .2 .6 .6 -.1 -.3 .1 .0 .1 .1 .1 .2 .2 .5 .3 .1 .1 .5 .5 .7 .5 -1.2 -1.3 -1.0 .1 .0 .0 -.1 .0 .1 .1 .1
.1 .0 .1 .1 .2 .1 .1 .4 .0 -.1 -.1 .0 .0 .1 .1 .2 .1 .0 -.1 -.2 -.4 .1 .1 .2 .2 .2 .2 -.5 .0 -.2 .0 -.1 .0 .1 .1 .0
.0 .0 .1 .1 .1 .1 .0 -.1 -.2 -.2 -.1 .0 .0 .0 .1 .1 .0 -.4 -.3 -.4 .1 .8 .4 .0 .0 .1 .0 -.6 -.6 .0 -.1 -.1 .0 .0 -.1 -.1
-.3 -.1 .0 -.1 .0 .0 -.1 -.1 -.1 -.1 -.6 -.4 -.3 -.1 .0 .0 -.2 -.2 -.5 -.6 -.4 .4 .3 .0 -.1 -.1 -.1 -.4 -.4 -.3 -.1 -.1 -.2 -.2 -.3 -.4
-.2 -.1 .0 .0 .1 .1 .1 .0 .0 .0 -.6 -.5 -.4 -.1 .0 .1 .1 .1 .0 .0 -.1 .1 .0 -.1 -.1 -.2 -.2 -.3 -.3 -.1 -.1 -.2 -.4 -.2 -.3 -.3
-.1 -.1 -.1 .0 .0 .1 .1 .1 .1 .1 .1 .1 .0 .2 .0 .1 .0 .0 .2 .7 .6 .3 .1 .0 .1 .1 .0 .0 .1 .0 .3 .4 .1 .0 -.2 -.2
.1 .1 .0 -.1 .0 .0 .1 .1 .1 .1 .1 .3 .1 .0 .1 .1 .1 .1 .2 .4 .5 .2 .1 .1 .2 .1 .2 .2 .1 .3 .4 .5 .4 .0 .0 -.1
.1 .2 .1 .1 .1 .1 .1 .1 .1 .2 .2 .2 .1 .1 .1 .1 .1 .1 .2 .2 .2 .1 .2 .2 .2 .2 .2 .2 .2 .1 .1 .1 .2 .1 .1 .0
.2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .3 .2 .3 .2 .2 .3 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .1
.2 .2 .2 .2 .2 .2 .2 .2 .2 .1 .0 .0 .1 .2 .1 .2 .1 .1 .2 .2 .2 .2 .1 .2 .2 .1 .2 .2 .2 .2 .1 .2 .2 .2 .2 .2
.0 .0 .0 .1 .2 .1 .2 .1 .1 .0 .0 .0 -.4 -.4 -.3 -.2 .0 -.1 -.1 .0 .0 -.1 -.1 -.3 -.2 .0 -.2 -.2 -.2 -.1 -.1 -.2 -.4 -.2 -.1 .1
-.4 -.5 -.6 -.5 -.8 -.8 -.6 -.7 -.7 -.3 -.3 -.5 -.4 -.2 -.3 -.6 -1.2 -2.5 -3.3 -3.1 -2.8 -2.5 -2.8 -2.7 -2.1 -2.3 -2.4 -1.4 -1.8 -2.2 -2.8 -2.8 -2.6 -2.3 -.7 -.5
-1.6 -1.6 -1.5 -1.1 -1.1 -1.2 -1.3 -1.4 -.8 -.5 -.7 -1.1 -1.1 -1.1 -1.5 -1.8 -2.4 -2.9 -3.3 -3.6 -3.4 -3.4 -3.4 -3.1 -2.7 -3.0 -2.3 -5.7 -5.5 -4.6 -4.6 -4.1 -3.7 -2.1 -1.7 -1.7

Figure 50. ATOVS SD O-B brightness temperature differences (deg C). MAY 2003
Channel: AMSUA-5 (700 hPa)
NOAA16, using all observations

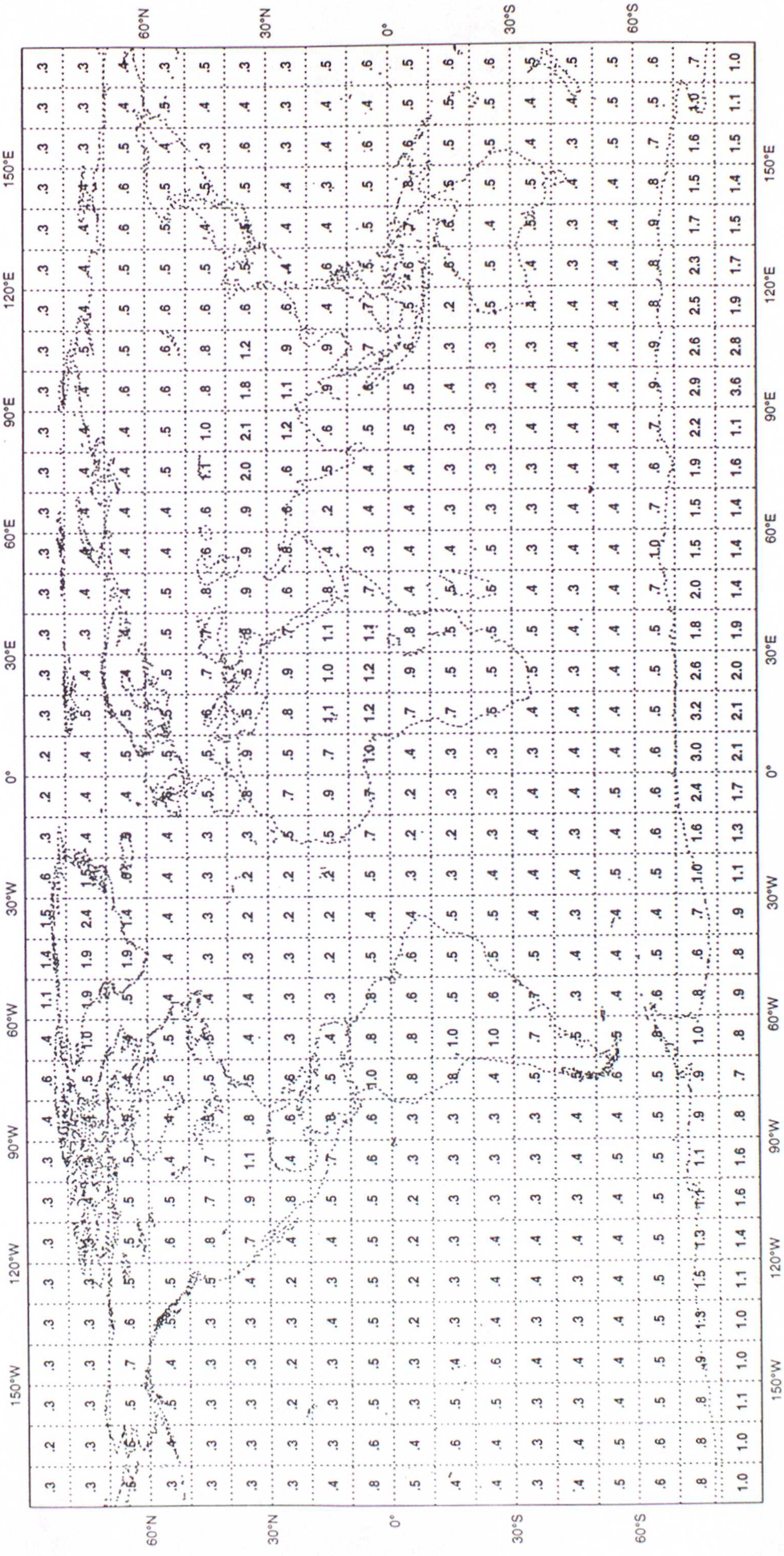

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 51. ATOVS MEAN O-B brightness temperature differences (deg C). MAY 2003
Channel: AMSUA-7 (300 hPa)
NOAA16, using all observations

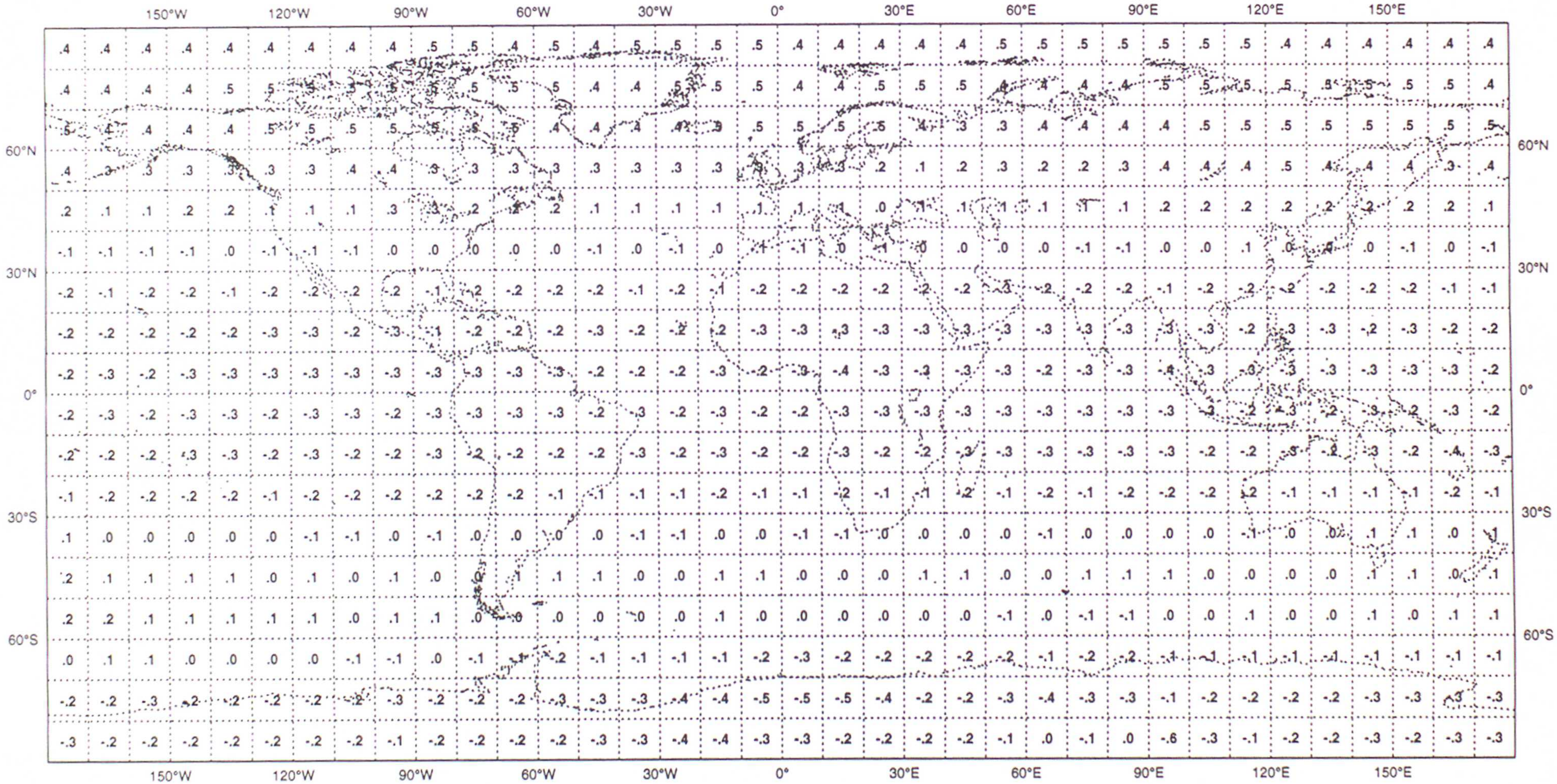

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 52. ATOVS SD O-B brightness temperature differences (deg C). MAY 2003
Channel: AMSUA-7 (300 hPa)
NOAA16, using all observations

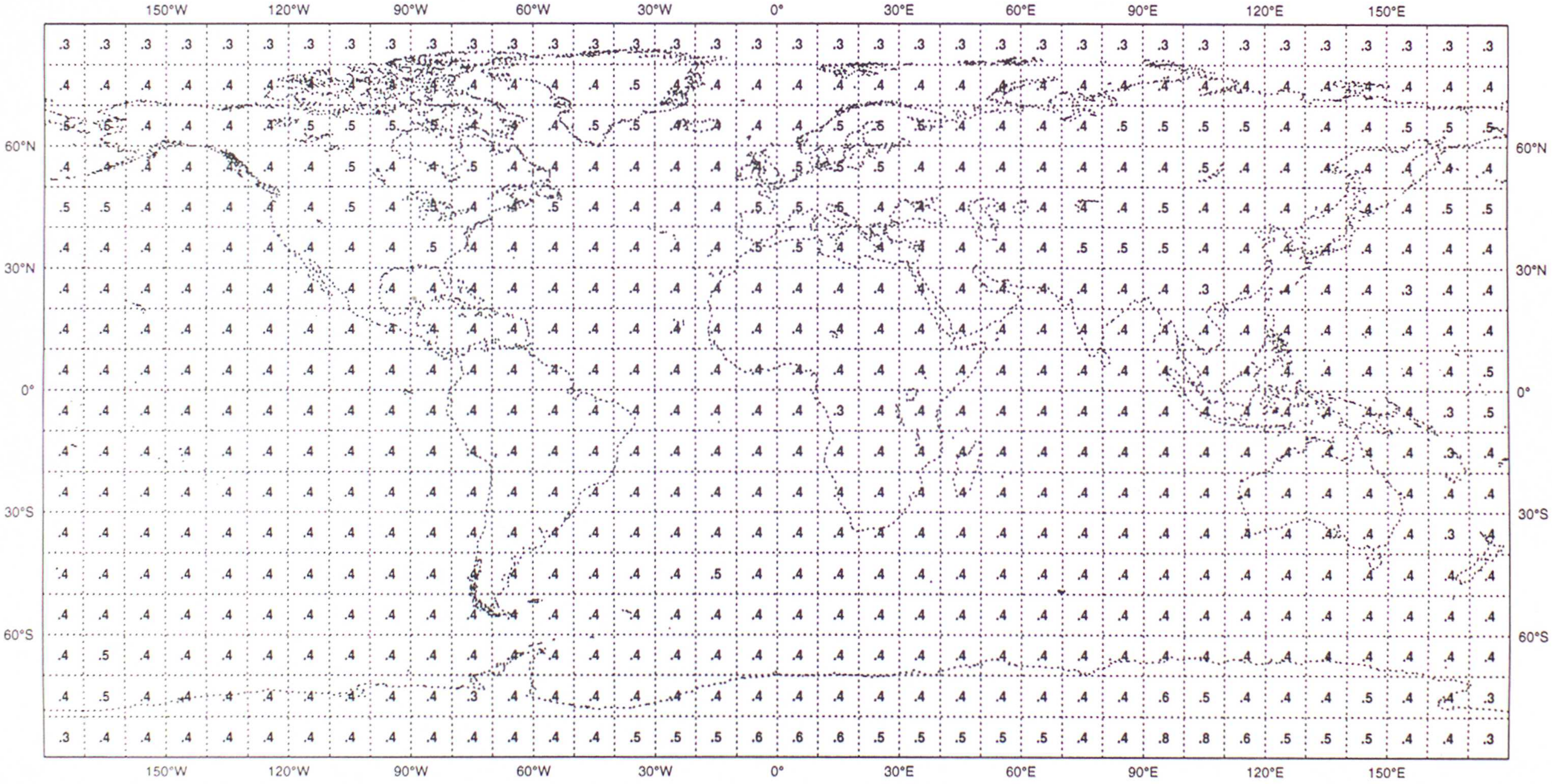

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 53. ATOVS MEAN O-B brightness temperature differences (deg C). MAY 2003
Channel: AMSUA-9 (100 hPa)
NOAA16, using all observations

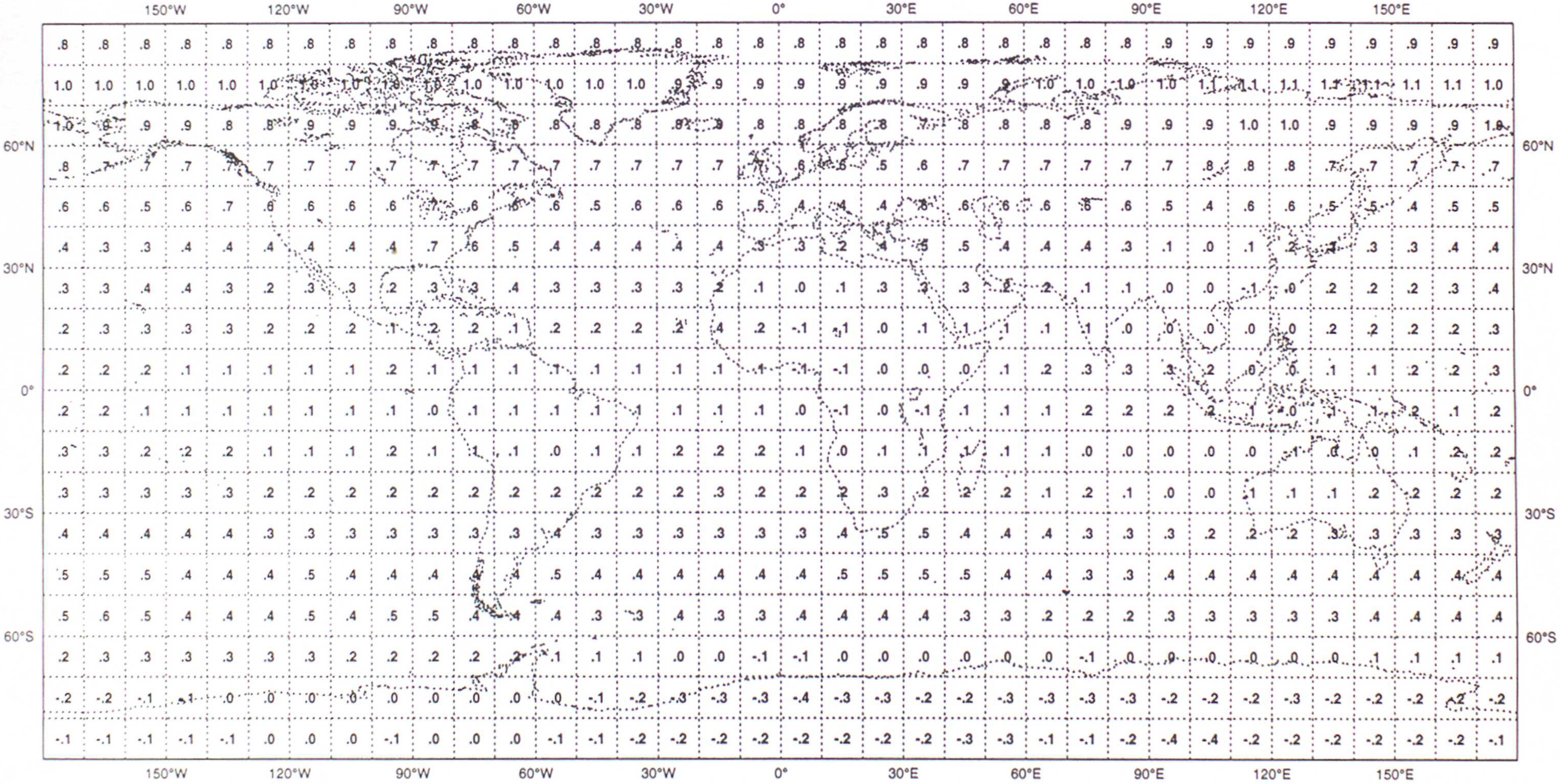

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 54. ATOVS SD O-B brightness temperature differences (deg C). MAY 2003
Channel: AMSUA-9 (100 hPa)
NOAA16, using all observations

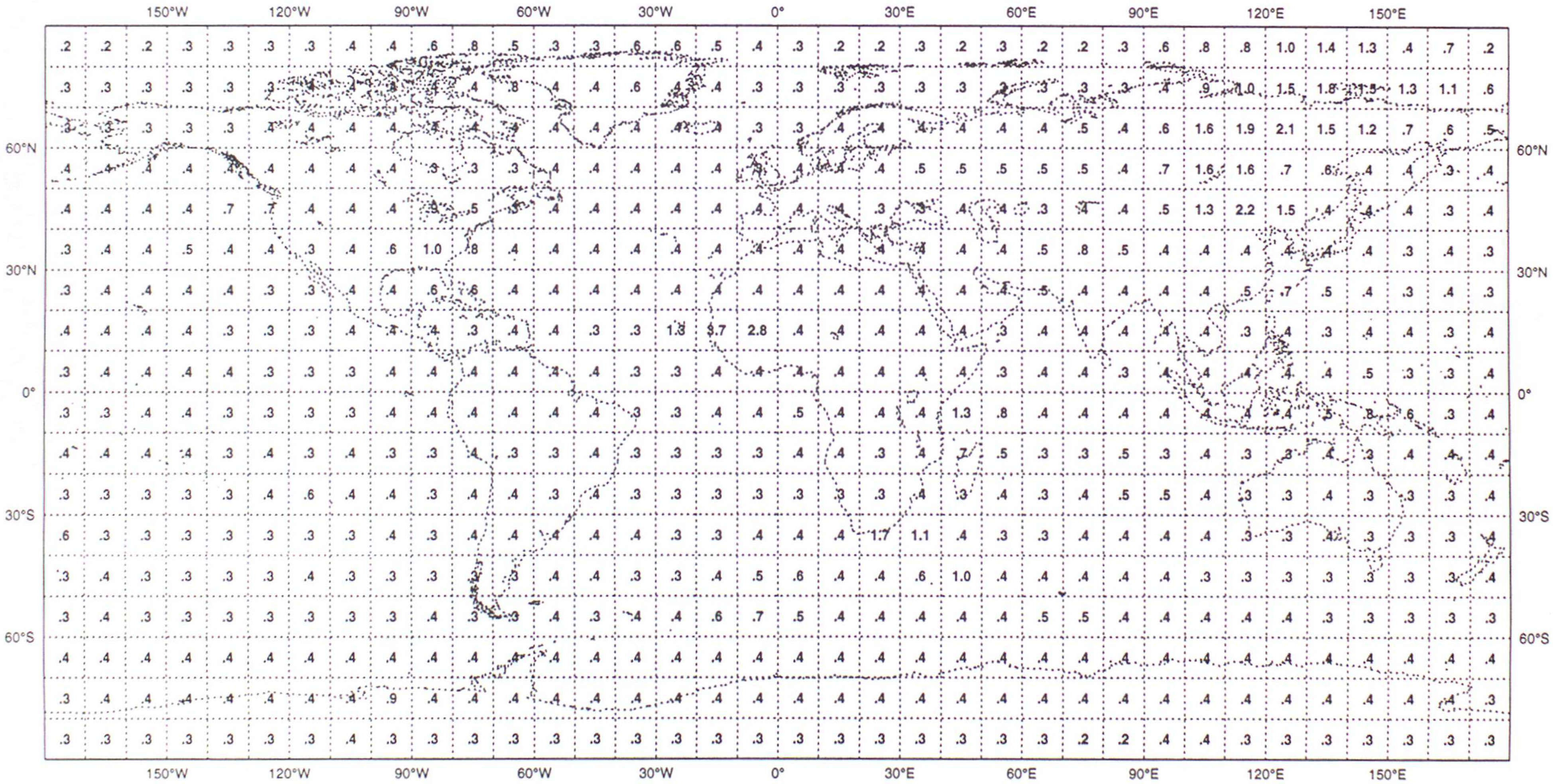
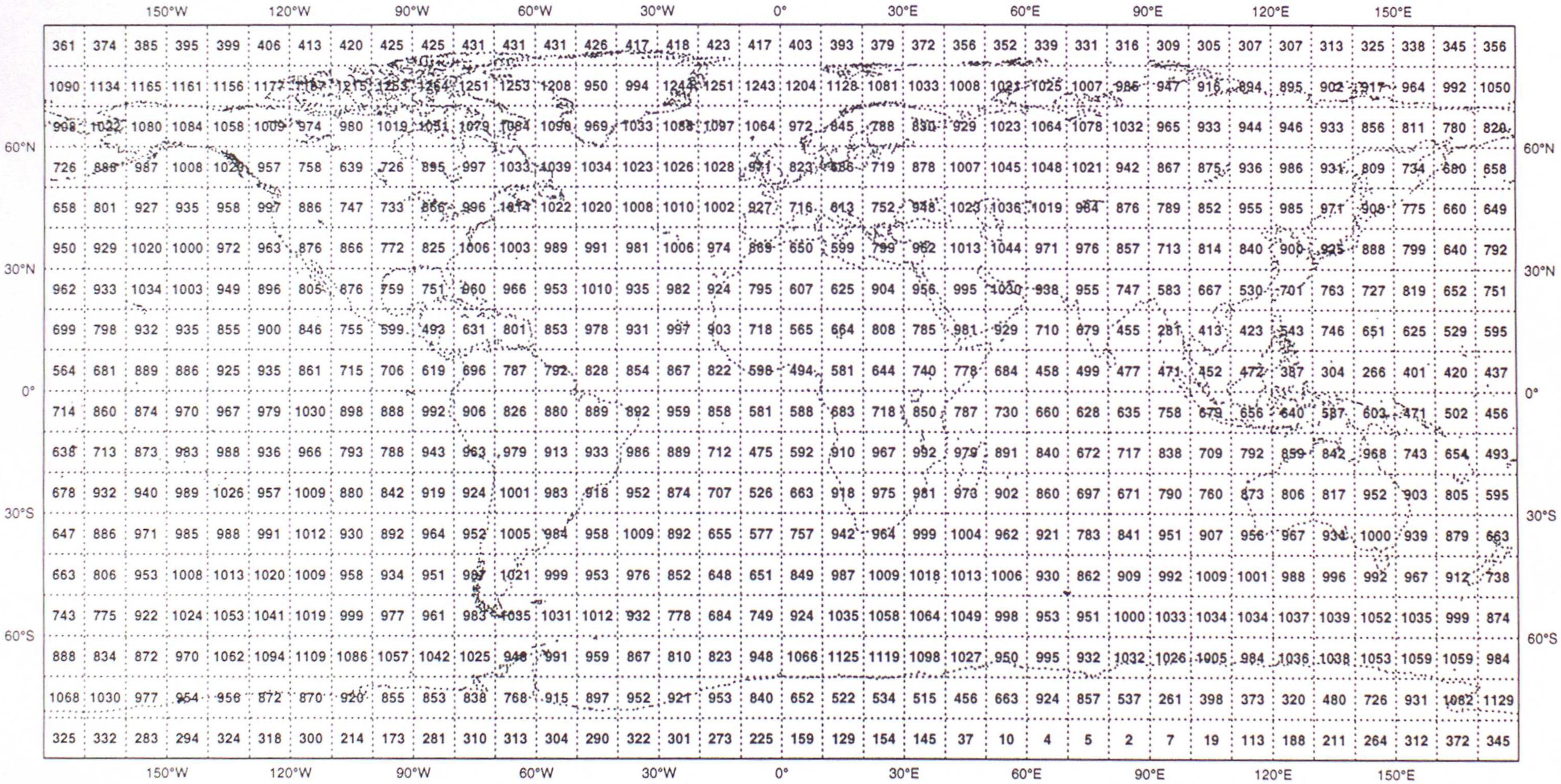
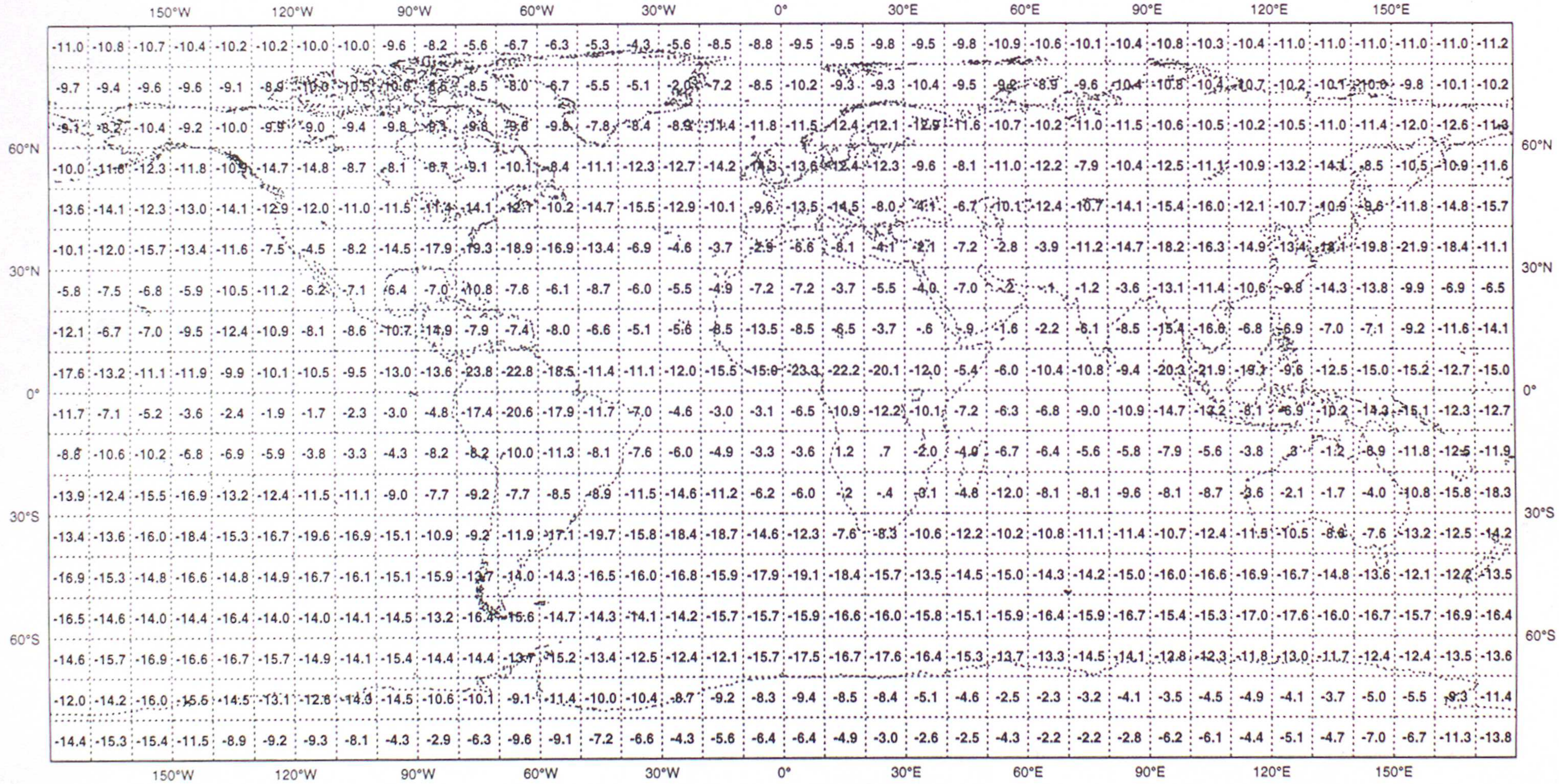

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
.2 .2 .2 .3 .3 .3 .3 .4 .4 .6 .8 .5 .3 .3 .6 .6 .5 .4 .3 .2 .2 .3 .2 .3 .2 .2 .3 .6 .8 .8 1.0 1.4 1.3 .4 .7 .2
.3 .3 .3 .3 .3 .3 .4 .4 .4 .4 .4 .8 .4 .4 .6 .4 .4 .3 .3 .3 .3 .3 .3 .2 .3 .3 .3 .4 .9 1.0 1.5 1.8 1.5 1.3 1.1 .6
.3 .3 .3 .3 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .3 .4 .4 .4 .4 .4 .4 .5 .4 .6 1.6 1.9 2.1 1.5 1.2 .7 .6 .5
.4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .3 .3 .4 .4 .4 .4 .4 .3 .4 .4 .4 .5 .5 .5 .5 .5 .4 .7 1.6 1.6 .7 .6 .4 .4 .3 .4
.4 .4 .4 .4 .7 .7 .4 .4 .4 .3 .5 .5 .4 .4 .4 .4 .4 .4 .4 .4 .3 .3 .4 .4 .3 .4 .4 .5 1.3 2.2 1.5 .4 .4 .4 .3 .4
.3 .4 .4 .5 .4 .4 .3 .4 .6 1.0 .8 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .8 .5 .4 .4 .4 .4 .4 .4 .3 .4 .3
.3 .4 .4 .4 .4 .3 .3 .4 .4 .6 .6 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .4 .4 .4 .4 .5 .7 .5 .4 .3 .4 .3
.4 .4 .4 .4 .3 .3 .3 .4 .4 .4 .3 .4 .4 .3 .3 1.3 3.7 2.8 .4 .4 .4 .4 .4 .3 .4 .4 .4 .4 .4 .3 .4 .3 .4 .4 .3 .4
.3 .4 .4 .4 .4 .3 .3 .3 .4 .4 .4 .4 .4 .4 .3 .3 .4 .4 .4 .4 .4 .4 .4 .3 .4 .4 .3 .4 .4 .4 .4 .4 .5 .3 .3 .4
.3 .3 .4 .4 .3 .3 .3 .3 .4 .4 .4 .4 .4 .4 .3 .3 .4 .4 .5 .4 .4 .4 1.3 .8 .4 .4 .4 .4 .4 .4 .4 .5 .8 .6 .3 .4
.4 .4 .4 .4 .3 .4 .3 .4 .3 .3 .4 .3 .3 .4 .3 .3 .3 .3 .4 .4 .3 .4 .7 .5 .3 .3 .5 .3 .4 .3 .3 .4 .3 .4 .4 .4
.3 .3 .3 .3 .3 .4 .6 .4 .4 .3 .4 .4 .3 .4 .3 .3 .3 .3 .3 .3 .3 .4 .3 .4 .3 .4 .5 .5 .4 .3 .3 .4 .3 .3 .3 .4
.6 .3 .3 .3 .3 .3 .3 .3 .4 .3 .4 .4 .4 .4 .4 .3 .3 .4 .4 .4 1.7 1.1 .4 .3 .3 .4 .4 .4 .4 .3 .3 .4 .3 .3 .3 .4
.3 .4 .3 .3 .3 .3 .4 .3 .3 .3 .3 .3 .4 .4 .3 .3 .4 .5 .6 .4 .4 .6 1.0 .4 .4 .4 .4 .4 .3 .3 .3 .3 .3 .3 .3 .4
.3 .4 .3 .3 .3 .3 .3 .3 .3 .4 .3 .3 .4 .3 .4 .4 .6 .7 .5 .4 .4 .4 .4 .4 .5 .5 .4 .4 .4 .4 .4 .3 .3 .3 .3 .3
.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4
.3 .4 .4 .4 .4 .4 .4 .4 .9 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3
.3 .3 .3 .3 .3 .3 .3 .4 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .2 .2 .4 .4 .3 .3 .3 .3 .3 .3 .3

Figure 55. ATOVS mean daily count. MAY 2003
NOAA17, using all observations
Global average number of observations in 24 hours = 525057



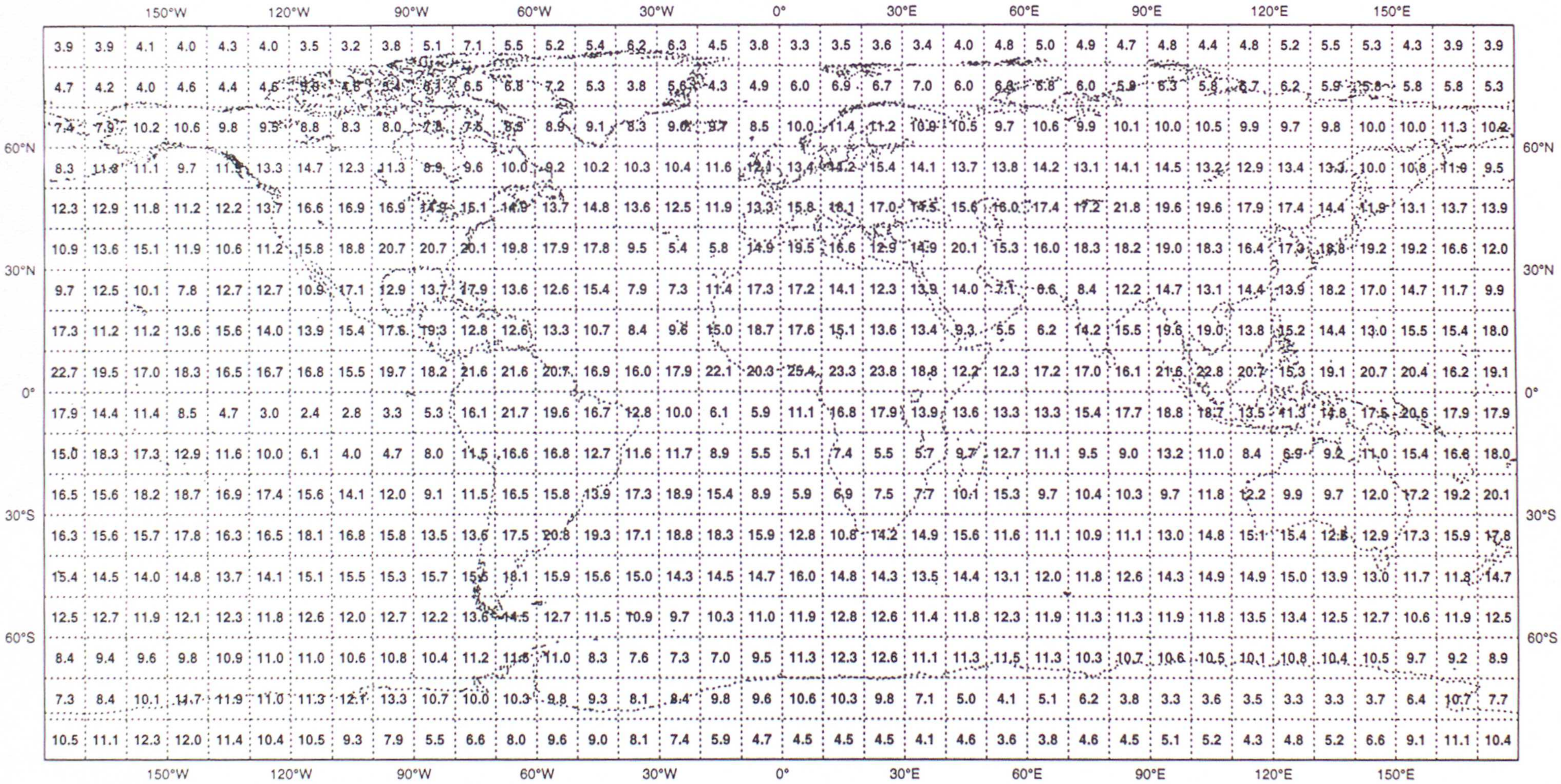
361	374	385	395	399	406	413	420	425	425	431	431	431	426	417	418	423	417	403	393	379	372	356	352	339	331	316	309	305	307	307	313	325	338	345	356
1090	1134	1165	1161	1156	1177	1187	1215	1253	1264	1251	1253	1208	950	994	1244	1251	1243	1204	1128	1081	1033	1008	1021	1025	1007	986	947	916	894	895	902	917	964	992	1050
998	1022	1080	1084	1058	1009	974	980	1019	1051	1079	1084	1098	969	1033	1088	1097	1064	972	845	788	830	929	1023	1064	1078	1032	965	933	944	946	933	856	811	780	820
726	886	987	1008	1029	957	758	639	726	895	997	1033	1039	1034	1023	1026	1028	971	823	686	719	878	1007	1045	1048	1021	942	867	875	936	986	931	809	734	680	658
658	801	927	935	958	997	886	747	733	866	996	1014	1022	1020	1008	1010	1002	927	716	613	752	948	1023	1036	1019	984	876	789	852	955	985	971	908	775	660	649
950	929	1020	1000	972	963	876	866	772	825	1006	1003	989	991	981	1006	974	869	650	599	799	962	1013	1044	971	976	857	713	814	840	900	925	888	799	640	792
962	933	1034	1003	949	896	805	876	759	751	860	966	953	1010	935	982	924	795	607	625	904	956	995	1030	938	955	747	583	667	530	701	763	727	819	652	751
699	798	932	935	855	900	846	755	599	493	631	801	853	978	931	997	903	718	565	664	808	785	981	929	710	679	455	281	413	423	543	746	651	625	529	595
564	681	889	886	925	935	861	715	706	619	696	787	792	828	854	867	822	598	494	581	644	740	778	684	458	499	477	471	452	472	387	304	266	401	420	437
714	860	874	970	967	979	1030	898	888	992	906	826	880	889	892	959	858	581	588	683	718	850	787	730	660	628	635	758	679	656	640	587	603	471	502	456
638	713	873	983	988	936	966	793	788	943	963	979	913	933	986	889	712	475	592	910	967	992	979	891	840	672	717	838	709	792	859	842	968	743	654	493
678	932	940	989	1026	957	1009	880	842	919	924	1001	983	918	952	874	707	526	663	918	975	981	973	902	860	697	671	790	760	873	806	817	952	903	805	595
647	886	971	985	988	991	1012	930	892	964	952	1005	984	958	1009	892	655	577	757	942	964	999	1004	962	921	783	841	951	907	956	967	934	1000	939	879	663
663	806	953	1008	1013	1020	1009	958	934	951	997	1021	999	953	976	852	648	651	849	987	1009	1018	1013	1006	930	862	909	992	1009	1001	988	996	992	967	912	738
743	775	922	1024	1053	1041	1019	999	977	961	983	1035	1031	1012	932	778	684	749	924	1035	1058	1064	1049	998	953	951	1000	1033	1034	1034	1037	1039	1052	1035	999	874
888	834	872	970	1062	1094	1109	1086	1057	1042	1025	948	991	959	867	810	823	948	1066	1125	1119	1098	1027	950	995	932	1032	1026	1005	984	1036	1038	1053	1059	1059	984
1068	1030	977	954	956	872	870	920	855	853	838	768	915	897	952	921	953	840	652	522	534	515	456	663	924	857	537	261	398	373	320	480	726	931	1082	1129
325	332	283	294	324	318	300	214	173	281	310	313	304	290	322	301	273	225	159	129	154	145	37	10	4	5	2	7	19	113	188	211	264	312	372	345

Figure 56. ATOVS MEAN O-B brightness temperature differences (deg C). MAY 2003
Channel: HIRS8 (Surface)
NOAA17, using all observations



-11.0	-10.8	-10.7	-10.4	-10.2	-10.2	-10.0	-10.0	-9.6	-8.2	-5.6	-6.7	-6.3	-5.3	-4.3	-5.6	-8.5	-8.8	-9.5	-9.5	-9.8	-9.5	-9.8	-10.9	-10.6	-10.1	-10.4	-10.8	-10.3	-10.4	-11.0	-11.0	-11.0	-11.0	-11.0	-11.2
-9.7	-9.4	-9.6	-9.6	-9.1	-8.9	-10.0	-10.5	-10.6	-8.6	-8.5	-8.0	-6.7	-5.5	-5.1	-2.0	-7.2	-8.5	-10.2	-9.3	-9.3	-10.4	-9.5	-9.2	-8.9	-9.6	-10.4	-10.8	-10.4	-10.7	-10.2	-10.1	-10.0	-9.8	-10.1	-10.2
-9.1	-8.2	-10.4	-9.2	-10.0	-9.9	-9.0	-9.4	-9.8	-9.3	-9.8	-9.6	-9.8	-7.8	-8.4	-8.9	-11.4	-11.8	-11.5	-12.4	-12.1	-12.9	-11.6	-10.7	-10.2	-11.0	-11.5	-10.6	-10.5	-10.2	-10.5	-11.0	-11.4	-12.0	-12.6	-11.3
-10.0	-11.6	-12.3	-11.8	-10.9	-14.7	-14.8	-8.7	-8.1	-8.7	-9.1	-10.1	-8.4	-11.1	-12.3	-12.7	-14.2	-14.3	-13.6	-12.4	-12.3	-9.6	-8.1	-11.0	-12.2	-7.9	-10.4	-12.5	-11.1	-10.9	-13.2	-14.1	-8.5	-10.5	-10.9	-11.6
-13.6	-14.1	-12.3	-13.0	-14.1	-12.9	-12.0	-11.0	-11.5	-11.4	-14.1	-12.1	-10.2	-14.7	-15.5	-12.9	-10.1	-9.6	-13.5	-14.5	-8.0	-4.1	-6.7	-10.1	-12.4	-10.7	-14.1	-15.4	-16.0	-12.1	-10.7	-10.9	-9.6	-11.8	-14.8	-15.7
-10.1	-12.0	-15.7	-13.4	-11.6	-7.5	-4.5	-8.2	-14.5	-17.9	-19.3	-18.9	-16.9	-13.4	-6.9	-4.6	-3.7	-2.9	-6.6	-8.1	-4.1	-2.1	-7.2	-2.8	-3.9	-11.2	-14.7	-18.2	-16.3	-14.9	-13.4	-18.1	-19.8	-21.9	-18.4	-11.1
-5.8	-7.5	-6.8	-5.9	-10.5	-11.2	-6.2	-7.1	-6.4	-7.0	-10.8	-7.6	-6.1	-8.7	-6.0	-5.5	-4.9	-7.2	-7.2	-3.7	-5.5	-4.0	-7.0	-.2	-.1	-1.2	-3.6	-13.1	-11.4	-10.6	-9.8	-14.3	-13.8	-9.9	-6.9	-6.5
-12.1	-6.7	-7.0	-9.5	-12.4	-10.9	-8.1	-8.6	-10.7	-14.9	-7.9	-7.4	-8.0	-6.6	-5.1	-5.6	-8.5	-13.5	-8.5	-6.5	-3.7	-.6	-.9	-1.6	-2.2	-6.1	-8.5	-15.4	-16.6	-6.8	-6.9	-7.0	-7.1	-9.2	-11.6	-14.1
-17.6	-13.2	-11.1	-11.9	-9.9	-10.1	-10.5	-9.5	-13.0	-13.6	-23.8	-22.8	-18.5	-11.4	-11.1	-12.0	-15.5	-15.0	-23.3	-22.2	-20.1	-12.0	-5.4	-6.0	-10.4	-10.8	-9.4	-20.3	-21.9	-19.1	-9.6	-12.5	-15.0	-15.2	-12.7	-15.0
-11.7	-7.1	-5.2	-3.6	-2.4	-1.9	-1.7	-2.3	-3.0	-4.8	-17.4	-20.6	-17.9	-11.7	-7.0	-4.6	-3.0	-3.1	-6.5	-10.9	-12.2	-10.1	-7.2	-6.3	-6.8	-9.0	-10.9	-14.7	-13.2	-8.1	-6.9	-10.2	-14.3	-15.1	-12.3	-12.7
-8.8	-10.6	-10.2	-6.8	-6.9	-5.9	-3.8	-3.3	-4.3	-8.2	-8.2	-10.0	-11.3	-8.1	-7.6	-6.0	-4.9	-3.3	-3.6	1.2	.7	-2.0	-4.0	-6.7	-6.4	-5.6	-5.8	-7.9	-5.6	-3.8	.3	-1.2	-8.9	-11.8	-12.5	-11.9
-13.9	-12.4	-15.5	-16.9	-13.2	-12.4	-11.5	-11.1	-9.0	-7.7	-9.2	-7.7	-8.5	-8.9	-11.5	-14.6	-11.2	-6.2	-6.0	-.2	-.4	-3.1	-4.8	-12.0	-8.1	-8.1	-9.6	-8.1	-8.7	-3.6	-2.1	-1.7	-4.0	-10.8	-15.8	-18.3
-13.4	-13.6	-16.0	-18.4	-15.3	-16.7	-19.6	-16.9	-15.1	-10.9	-9.2	-11.9	-17.1	-19.7	-15.8	-18.4	-18.7	-14.6	-12.3	-7.6	-8.3	-10.6	-12.2	-10.2	-10.8	-11.1	-11.4	-10.7	-12.4	-11.5	-10.5	-8.6	-7.6	-13.2	-12.5	-14.2
-16.9	-15.3	-14.8	-16.6	-14.8	-14.9	-16.7	-16.1	-15.1	-15.9	-13.7	-14.0	-14.3	-16.5	-16.0	-16.8	-15.9	-17.9	-19.1	-18.4	-15.7	-13.5	-14.5	-15.0	-14.3	-14.2	-15.0	-16.0	-16.6	-16.9	-16.7	-14.8	-13.6	-12.1	-12.2	-13.5
-16.5	-14.6	-14.0	-14.4	-16.4	-14.0	-14.0	-14.1	-14.5	-13.2	-16.4	-15.6	-14.7	-14.3	-14.1	-14.2	-15.7	-15.7	-15.9	-16.6	-16.0	-15.8	-15.1	-15.9	-16.4	-15.9	-16.7	-15.4	-15.3	-17.0	-17.6	-16.0	-16.7	-15.7	-16.9	-16.4
-14.6	-15.7	-16.9	-16.6	-16.7	-15.7	-14.9	-14.1	-15.4	-14.4	-14.4	-13.7	-15.2	-13.4	-12.5	-12.4	-12.1	-15.7	-17.5	-16.7	-17.6	-16.4	-15.3	-13.7	-13.3	-14.5	-14.1	-12.8	-12.3	-11.8	-13.0	-11.7	-12.4	-12.4	-13.5	-13.6
-12.0	-14.2	-16.0	-15.6	-14.5	-13.1	-12.8	-14.3	-14.5	-10.6	-10.1	-9.1	-11.4	-10.0	-10.4	-8.7	-9.2	-8.3	-9.4	-8.5	-8.4	-5.1	-4.6	-2.5	-2.3	-3.2	-4.1	-3.5	-4.5	-4.9	-4.1	-3.7	-5.0	-5.5	-9.3	-11.4
-14.4	-15.3	-15.4	-11.5	-8.9	-9.2	-9.3	-8.1	-4.3	-2.9	-6.3	-9.6	-9.1	-7.2	-6.6	-4.3	-5.6	-6.4	-6.4	-4.9	-3.0	-2.6	-2.5	-4.3	-2.2	-2.2	-2.8	-6.2	-6.1	-4.4	-5.1	-4.7	-7.0	-6.7	-11.3	-13.8

Figure 57. ATOVS SD O-B brightness temperature differences (deg C). MAY 2003
Channel: HIRS8 (Surface)
NOAA17, using all observations



3.9	3.9	4.1	4.0	4.3	4.0	3.5	3.2	3.8	5.1	7.1	5.5	5.2	5.4	6.2	6.3	4.5	3.8	3.3	3.5	3.6	3.4	4.0	4.8	5.0	4.9	4.7	4.8	4.4	4.8	5.2	5.5	5.3	4.3	3.9	3.9
4.7	4.2	4.0	4.6	4.4	4.6	5.6	4.6	5.4	6.1	6.5	6.8	7.2	5.3	3.8	5.6	4.3	4.9	6.0	6.9	6.7	7.0	6.0	6.8	6.8	6.0	5.9	6.3	5.8	6.7	6.2	5.9	5.8	5.8	5.8	5.3
7.4	7.9	10.2	10.6	9.8	9.5	8.8	8.3	8.0	7.8	7.5	8.5	8.9	9.1	8.3	9.6	9.7	8.5	10.0	11.4	11.2	10.9	10.5	9.7	10.6	9.9	10.1	10.0	10.5	9.9	9.7	9.8	10.0	10.0	11.3	10.2
8.3	11.8	11.1	9.7	11.5	13.3	14.7	12.3	11.3	8.9	9.6	10.0	9.2	10.2	10.3	10.4	11.6	12.1	13.4	14.2	15.4	14.1	13.7	13.8	14.2	13.1	14.1	14.5	13.2	12.9	13.4	13.3	10.0	10.8	11.9	9.5
12.3	12.9	11.8	11.2	12.2	13.7	16.6	16.9	16.9	14.9	15.1	14.9	13.7	14.8	13.6	12.5	11.9	13.3	15.8	18.1	17.0	14.5	15.6	16.0	17.4	17.2	21.8	19.6	19.6	17.9	17.4	14.4	11.9	13.1	13.7	13.9
10.9	13.6	15.1	11.9	10.6	11.2	15.8	18.8	20.7	20.7	20.1	19.8	17.9	17.8	9.5	5.4	5.8	14.9	19.5	16.6	12.9	14.9	20.1	15.3	16.0	18.3	18.2	19.0	18.3	16.4	17.3	18.8	19.2	19.2	16.6	12.0
9.7	12.5	10.1	7.8	12.7	12.7	10.9	17.1	12.9	13.7	17.9	13.6	12.6	15.4	7.9	7.3	11.4	17.3	17.2	14.1	12.3	13.9	14.0	7.1	8.6	8.4	12.2	14.7	13.1	14.4	13.9	18.2	17.0	14.7	11.7	9.9
17.3	11.2	11.2	13.6	15.6	14.0	13.9	15.4	17.6	19.3	12.8	12.6	13.3	10.7	8.4	9.6	15.0	18.7	17.6	15.1	13.6	13.4	9.3	5.5	6.2	14.2	15.5	19.6	19.0	13.8	15.2	14.4	13.0	15.5	15.4	18.0
22.7	19.5	17.0	18.3	16.5	16.7	16.8	15.5	19.7	18.2	21.6	21.6	20.7	16.9	16.0	17.9	22.1	20.3	25.4	23.3	23.8	18.8	12.2	12.3	17.2	17.0	16.1	21.6	22.8	20.7	15.3	19.1	20.7	20.4	16.2	19.1
17.9	14.4	11.4	8.5	4.7	3.0	2.4	2.8	3.3	5.3	16.1	21.7	19.6	16.7	12.8	10.0	6.1	5.9	11.1	16.8	17.9	13.9	13.6	13.3	13.3	15.4	17.7	18.8	18.7	13.5	11.3	14.8	17.5	20.6	17.9	17.9
15.0	18.3	17.3	12.9	11.6	10.0	6.1	4.0	4.7	8.0	11.5	16.6	16.8	12.7	11.6	11.7	8.9	5.5	5.1	7.4	5.5	5.7	9.7	12.7	11.1	9.5	9.0	13.2	11.0	8.4	6.9	9.2	11.0	15.4	16.6	18.0
16.5	15.6	18.2	18.7	16.9	17.4	15.6	14.1	12.0	9.1	11.5	16.5	15.8	13.9	17.3	18.9	15.4	8.9	5.9	6.9	7.5	7.7	10.1	15.3	9.7	10.4	10.3	9.7	11.8	12.2	9.9	9.7	12.0	17.2	19.2	20.1
16.3	15.6	15.7	17.8	16.3	16.5	18.1	16.8	15.8	13.5	13.6	17.5	20.8	19.3	17.1	18.8	18.3	15.9	12.8	10.8	14.2	14.9	15.6	11.6	11.1	10.9	11.1	13.0	14.8	15.1	15.4	12.8	12.9	17.3	15.9	17.8
15.4	14.5	14.0	14.8	13.7	14.1	15.1	15.5	15.3	15.7	15.5	18.1	15.9	15.6	15.0	14.3	14.5	14.7	16.0	14.8	14.3	13.5	14.4	13.1	12.0	11.8	12.6	14.3	14.9	14.9	15.0	13.9	13.0	11.7	11.8	14.7
12.5	12.7	11.9	12.1	12.3	11.8	12.6	12.0	12.7	12.2	13.6	14.5	12.7	11.5	10.9	9.7	10.3	11.0	11.9	12.8	12.6	11.4	11.8	12.3	11.9	11.3	11.3	11.9	11.8	13.5	13.4	12.5	12.7	10.6	11.9	12.5
8.4	9.4	9.6	9.8	10.9	11.0	11.0	10.6	10.8	10.4	11.2	11.6	11.0	8.3	7.6	7.3	7.0	9.5	11.3	12.3	12.6	11.1	11.3	11.5	11.3	10.3	10.7	10.6	10.5	10.1	10.8	10.4	10.5	9.7	9.2	8.9
7.3	8.4	10.1	11.7	11.9	11.0	11.3	12.1	13.3	10.7	10.0	10.3	9.8	9.3	8.1	8.4	9.8	9.6	10.6	10.3	9.8	7.1	5.0	4.1	5.1	6.2	3.8	3.3	3.6	3.5	3.3	3.3	3.7	6.4	10.7	7.7
10.5	11.1	12.3	12.0	11.4	10.4	10.5	9.3	7.9	5.5	6.6	8.0	9.6	9.0	8.1	7.4	5.9	4.7	4.5	4.5	4.5	4.1	4.6	3.6	3.8	4.6	4.5	5.1	5.2	4.3	4.8	5.2	6.6	9.1	11.1	10.4

Figure 58. ATOVS MEAN O-B brightness temperature differences (deg C). MAY 2003
Channel: HIRS15 (700 hPa)
NOAA17, using all observations

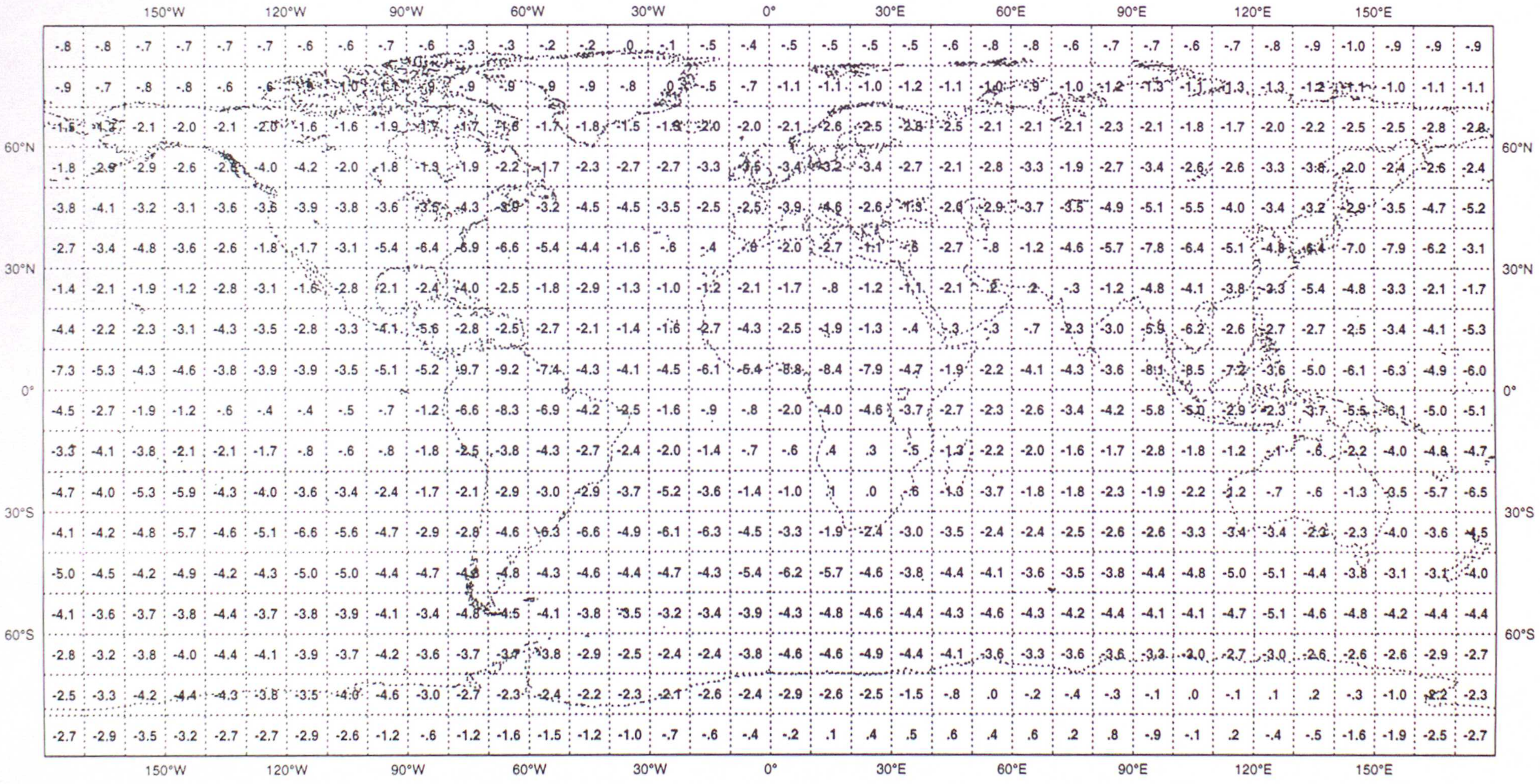
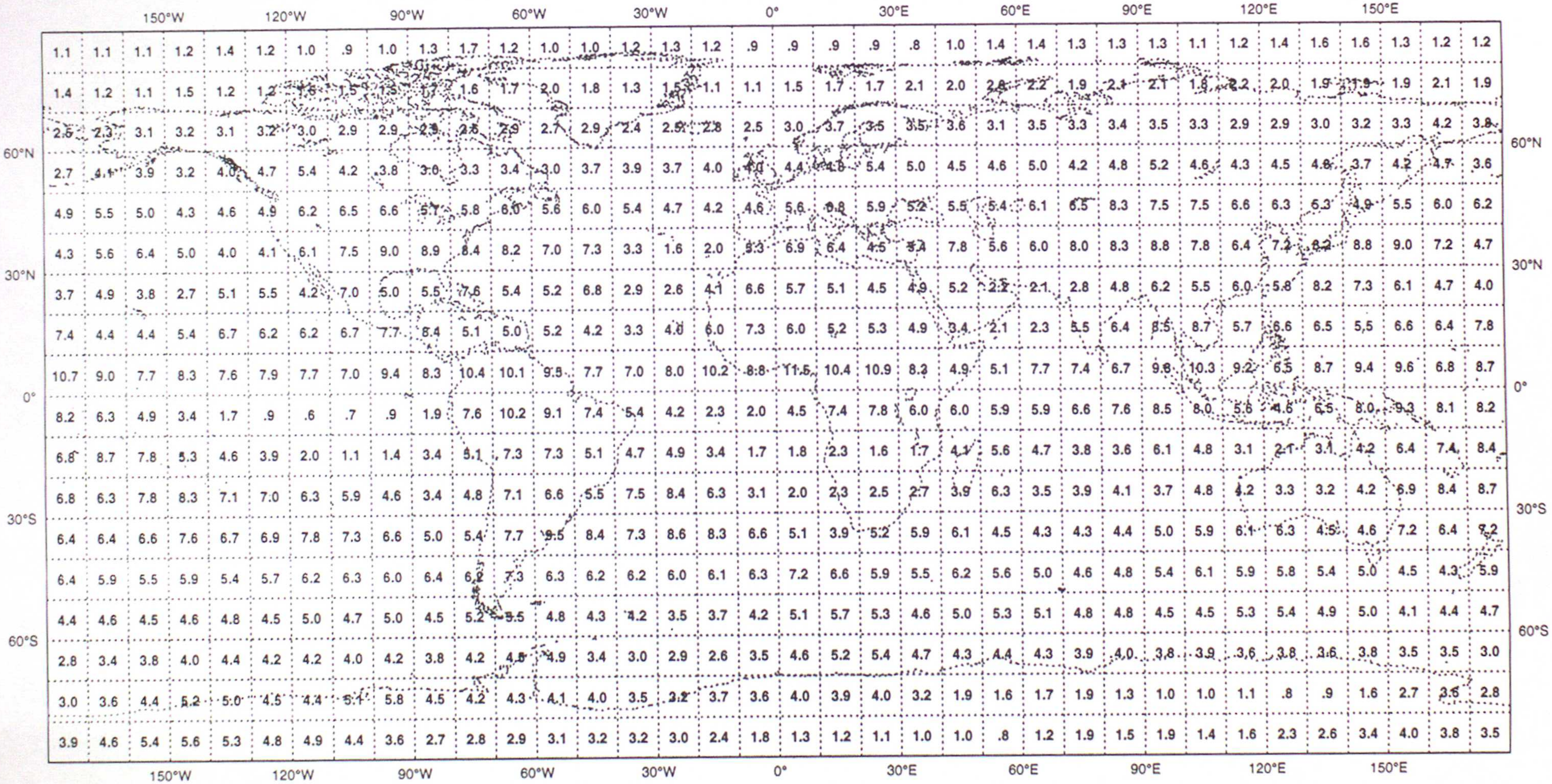
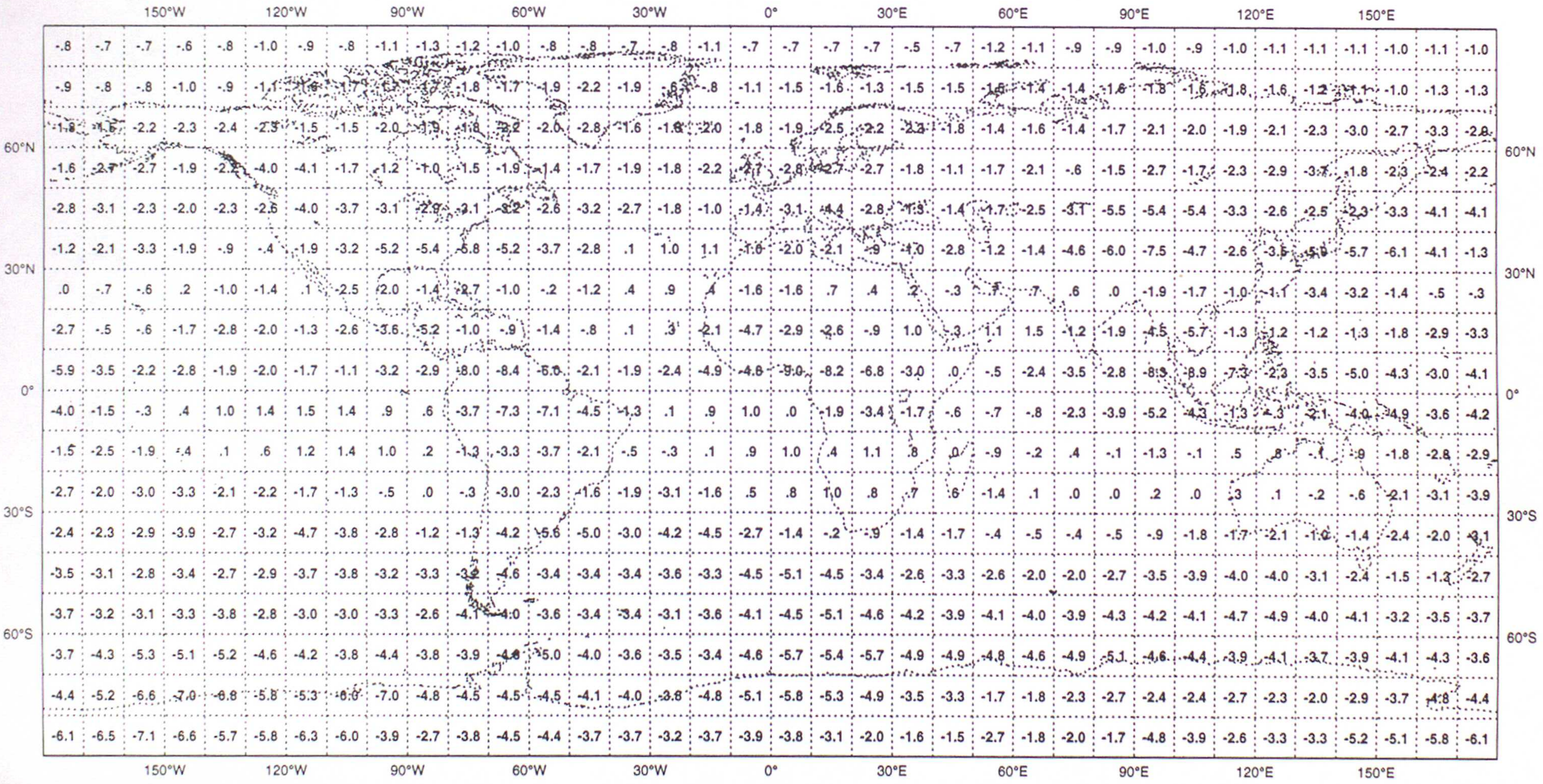

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
-.8 -.8 -.7 -.7 -.7 -.7 -.6 -.6 -.7 -.6 -.3 -.3 -.2 -.2 0 -.1 -.5 -.4 -.5 -.5 -.5 -.5 -.6 -.8 -.8 -.6 -.7 -.7 -.6 -.7 -.8 -.9 -1.0 -.9 -.9 -.9
-.9 -.7 -.8 -.8 -.6 -.6 -.9 -1.0 -1.1 -.9 -.9 -.9 -.9 -.9 -.8 -.3 -.5 -.7 -1.1 -1.1 -1.0 -1.2 -1.1 -1.0 -.9 -1.0 -1.2 -1.3 -1.1 -1.3 -1.3 -1.2 -1.1 -1.0 -1.1 -1.1
-1.5 -1.2 -2.1 -2.0 -2.1 -2.0 -1.6 -1.6 -1.9 -1.7 -1.7 -1.6 -1.7 -1.8 -1.5 -1.9 -2.0 -2.0 -2.1 -2.6 -2.5 -2.8 -2.5 -2.1 -2.1 -2.1 -2.3 -2.1 -1.8 -1.7 -2.0 -2.2 -2.5 -2.5 -2.8 -2.8
-1.8 -2.9 -2.9 -2.6 -2.8 -4.0 -4.2 -2.0 -1.8 -1.9 -1.9 -2.2 -1.7 -2.3 -2.7 -2.7 -3.3 -3.5 -3.4 -3.2 -3.4 -2.7 -2.1 -2.8 -3.3 -1.9 -2.7 -3.4 -2.6 -2.6 -3.3 -3.8 -2.0 -2.4 -2.6 -2.4
-3.8 -4.1 -3.2 -3.1 -3.6 -3.6 -3.9 -3.8 -3.6 -3.5 -4.3 -3.9 -3.2 -4.5 -4.5 -3.5 -2.5 -2.5 -3.9 -4.6 -2.6 -1.3 -2.6 -2.9 -3.7 -3.5 -4.9 -5.1 -5.5 -4.0 -3.4 -3.2 -2.9 -3.5 -4.7 -5.2
-2.7 -3.4 -4.8 -3.6 -2.6 -1.8 -1.7 -3.1 -5.4 -6.4 -6.9 -6.6 -5.4 -4.4 -1.6 -.6 -.4 -.8 -2.0 -2.7 -1.1 -.6 -2.7 -.8 -1.2 -4.6 -5.7 -7.8 -6.4 -5.1 -4.8 -6.4 -7.0 -7.9 -6.2 -3.1
-1.4 -2.1 -1.9 -1.2 -2.8 -3.1 -1.6 -2.8 -2.1 -2.4 -4.0 -2.5 -1.8 -2.9 -1.3 -1.0 -1.2 -2.1 -1.7 -.8 -1.2 -1.1 -2.1 .2 .2 -.3 -1.2 -4.8 -4.1 -3.8 -3.3 -5.4 -4.8 -3.3 -2.1 -1.7
-4.4 -2.2 -2.3 -3.1 -4.3 -3.5 -2.8 -3.3 -4.1 -5.6 -2.8 -2.5 -2.7 -2.1 -1.4 -1.6 -2.7 -4.3 -2.5 -1.9 -1.3 -.4 -.3 -.3 -.7 -2.3 -3.0 -5.9 -6.2 -2.6 -2.7 -2.7 -2.5 -3.4 -4.1 -5.3
-7.3 -5.3 -4.3 -4.6 -3.8 -3.9 -3.9 -3.5 -5.1 -5.2 -9.7 -9.2 -7.4 -4.3 -4.1 -4.5 -6.1 -6.4 -8.8 -8.4 -7.9 -4.7 -1.9 -2.2 -4.1 -4.3 -3.6 -8.1 -8.5 -7.2 -3.6 -5.0 -6.1 -6.3 -4.9 -6.0
-4.5 -2.7 -1.9 -1.2 -.6 -.4 -.4 -.5 -.7 -1.2 -6.6 -8.3 -6.9 -4.2 -2.5 -1.6 -.9 -.8 -2.0 -4.0 -4.6 -3.7 -2.7 -2.3 -2.6 -3.4 -4.2 -5.8 -5.0 -2.9 -2.3 -3.7 -5.5 -6.1 -5.0 -5.1
-3.3 -4.1 -3.8 -2.1 -2.1 -1.7 -.8 -.6 -.8 -1.8 -2.5 -3.8 -4.3 -2.7 -2.4 -2.0 -1.4 -.7 -.6 .4 .3 -.5 -1.3 -2.2 -2.0 -1.6 -1.7 -2.8 -1.8 -1.2 -.1 -.6 -2.2 -4.0 -4.8 -4.7
-4.7 -4.0 -5.3 -5.9 -4.3 -4.0 -3.6 -3.4 -2.4 -1.7 -2.1 -2.9 -3.0 -2.9 -3.7 -5.2 -3.6 -1.4 -1.0 .1 .0 -.6 -1.3 -3.7 -1.8 -1.8 -2.3 -1.9 -2.2 -1.2 -.7 -.6 -1.3 -3.5 -5.7 -6.5
-4.1 -4.2 -4.8 -5.7 -4.6 -5.1 -6.6 -5.6 -4.7 -2.9 -2.8 -4.6 -6.3 -6.6 -4.9 -6.1 -6.3 -4.5 -3.3 -1.9 -2.4 -3.0 -3.5 -2.4 -2.4 -2.5 -2.6 -2.6 -3.3 -3.4 -3.4 -2.3 -2.3 -4.0 -3.6 -4.5
-5.0 -4.5 -4.2 -4.9 -4.2 -4.3 -5.0 -5.0 -4.4 -4.7 -4.8 -4.8 -4.3 -4.6 -4.4 -4.7 -4.3 -5.4 -6.2 -5.7 -4.6 -3.8 -4.4 -4.1 -3.6 -3.5 -3.8 -4.4 -4.8 -5.0 -5.1 -4.4 -3.8 -3.1 -3.1 -4.0
-4.1 -3.6 -3.7 -3.8 -4.4 -3.7 -3.8 -3.9 -4.1 -3.4 -4.8 -4.5 -4.1 -3.8 -3.5 -3.2 -3.4 -3.9 -4.3 -4.8 -4.6 -4.4 -4.3 -4.6 -4.3 -4.2 -4.4 -4.1 -4.1 -4.7 -5.1 -4.6 -4.8 -4.2 -4.4 -4.4
-2.8 -3.2 -3.8 -4.0 -4.4 -4.1 -3.9 -3.7 -4.2 -3.6 -3.7 -3.7 -3.8 -2.9 -2.5 -2.4 -2.4 -3.8 -4.6 -4.6 -4.9 -4.4 -4.1 -3.6 -3.3 -3.6 -3.6 -3.3 -2.0 -2.7 -3.0 -2.6 -2.6 -2.6 -2.9 -2.7
-2.5 -3.3 -4.2 -4.4 -4.3 -3.8 -3.5 -4.0 -4.6 -3.0 -2.7 -2.3 -2.4 -2.2 -2.3 -2.1 -2.6 -2.4 -2.9 -2.6 -2.5 -1.5 -.8 .0 -.2 -.4 -.3 -.1 .0 -.1 .1 .2 -.3 -1.0 -2.2 -2.3
-2.7 -2.9 -3.5 -3.2 -2.7 -2.7 -2.9 -2.6 -1.2 -.6 -1.2 -1.6 -1.5 -1.2 -1.0 -.7 -.6 -.4 -.2 .1 .4 .5 .6 .4 .6 .2 .8 -.9 -.1 .2 -.4 -.5 -1.6 -1.9 -2.5 -2.7

Figure 59. ATOVS SD O-B brightness temperature differences (deg C). MAY 2003
Channel: HIRS15 (700 hPa)
NOAA17, using all observations



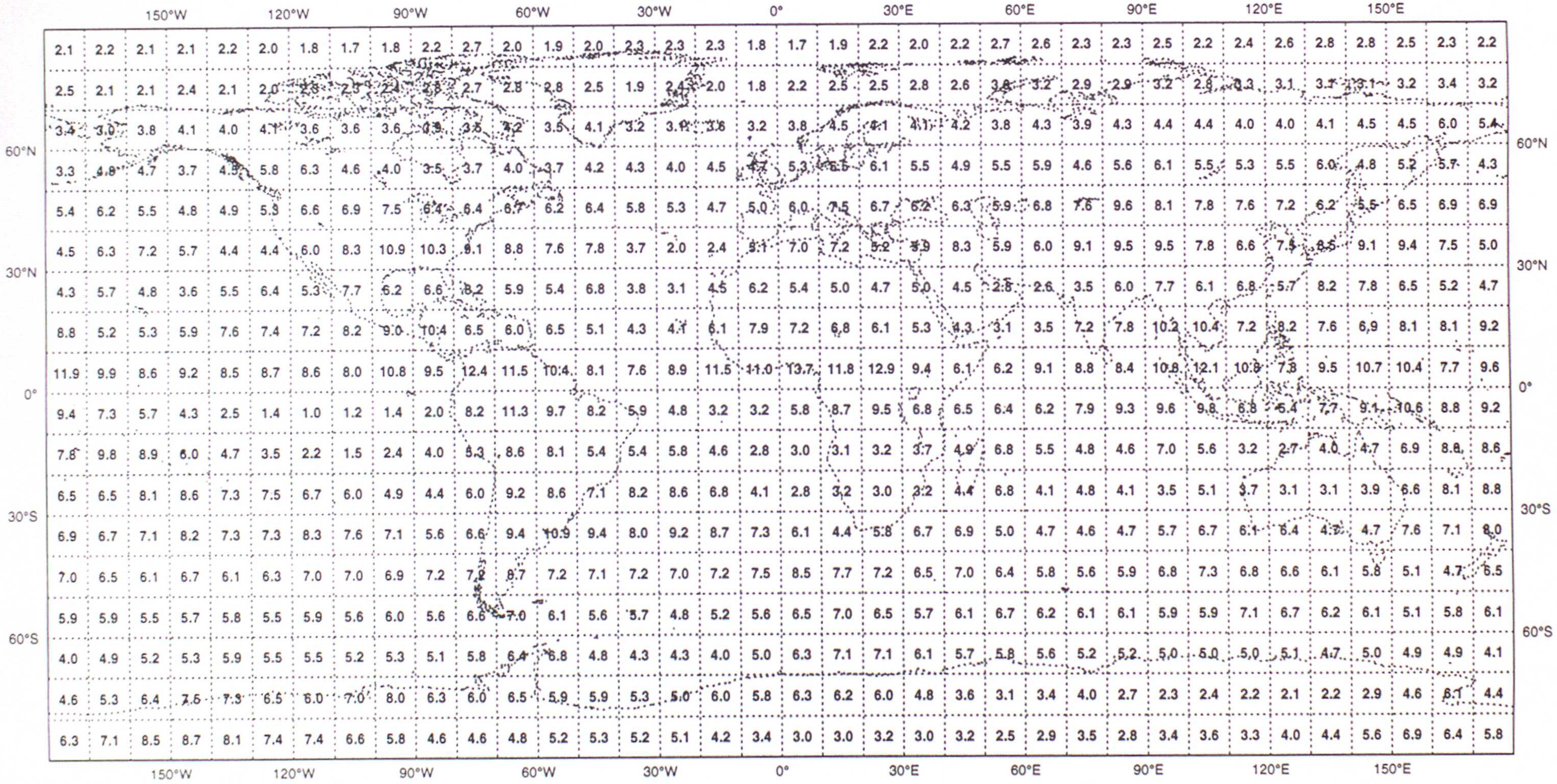
1.1	1.1	1.1	1.2	1.4	1.2	1.0	.9	1.0	1.3	1.7	1.2	1.0	1.0	1.2	1.3	1.2	.9	.9	.9	.9	.8	1.0	1.4	1.4	1.3	1.3	1.3	1.1	1.2	1.4	1.6	1.6	1.3	1.2	1.2
1.4	1.2	1.1	1.5	1.2	1.2	1.6	1.5	1.5	1.7	1.6	1.7	2.0	1.8	1.3	1.5	1.1	1.1	1.5	1.7	1.7	2.1	2.0	2.8	2.2	1.9	2.1	2.1	1.8	2.2	2.0	1.9	1.9	1.9	2.1	1.9
2.5	2.3	3.1	3.2	3.1	3.2	3.0	2.9	2.9	2.3	2.6	2.9	2.7	2.9	2.4	2.5	2.8	2.5	3.0	3.7	3.5	3.5	3.6	3.1	3.5	3.3	3.4	3.5	3.3	2.9	2.9	3.0	3.2	3.3	4.2	3.8
2.7	4.1	3.9	3.2	4.0	4.7	5.4	4.2	3.8	3.0	3.3	3.4	3.0	3.7	3.9	3.7	4.0	4.0	4.4	4.8	5.4	5.0	4.5	4.6	5.0	4.2	4.8	5.2	4.6	4.3	4.5	4.8	3.7	4.2	4.7	3.6
4.9	5.5	5.0	4.3	4.6	4.9	6.2	6.5	6.6	5.7	5.8	6.0	5.6	6.0	5.4	4.7	4.2	4.6	5.6	6.8	5.9	5.2	5.5	5.4	6.1	6.5	8.3	7.5	7.5	6.6	6.3	6.3	4.9	5.5	6.0	6.2
4.3	5.6	6.4	5.0	4.0	4.1	6.1	7.5	9.0	8.9	8.4	8.2	7.0	7.3	3.3	1.6	2.0	5.3	6.9	6.4	4.5	5.4	7.8	5.6	6.0	8.0	8.3	8.8	7.8	6.4	7.2	8.2	8.8	9.0	7.2	4.7
3.7	4.9	3.8	2.7	5.1	5.5	4.2	7.0	5.0	5.5	7.6	5.4	5.2	6.8	2.9	2.6	4.1	6.6	5.7	5.1	4.5	4.9	5.2	2.2	2.1	2.8	4.8	6.2	5.5	6.0	5.8	8.2	7.3	6.1	4.7	4.0
7.4	4.4	4.4	5.4	6.7	6.2	6.2	6.7	7.7	8.4	5.1	5.0	5.2	4.2	3.3	4.0	6.0	7.3	6.0	5.2	5.3	4.9	3.4	2.1	2.3	5.5	6.4	8.5	8.7	5.7	6.6	6.5	5.5	6.6	6.4	7.8
10.7	9.0	7.7	8.3	7.6	7.9	7.7	7.0	9.4	8.3	10.4	10.1	9.5	7.7	7.0	8.0	10.2	8.8	11.5	10.4	10.9	8.3	4.9	5.1	7.7	7.4	6.7	9.8	10.3	9.2	6.5	8.7	9.4	9.6	6.8	8.7
8.2	6.3	4.9	3.4	1.7	.9	.6	.7	.9	1.9	7.6	10.2	9.1	7.4	5.4	4.2	2.3	2.0	4.5	7.4	7.8	6.0	6.0	5.9	5.9	6.6	7.6	8.5	8.0	5.6	4.6	6.5	8.0	9.3	8.1	8.2
6.8	8.7	7.8	5.3	4.6	3.9	2.0	1.1	1.4	3.4	5.1	7.3	7.3	5.1	4.7	4.9	3.4	1.7	1.8	2.3	1.6	1.7	4.1	5.6	4.7	3.8	3.6	6.1	4.8	3.1	2.1	3.1	4.2	6.4	7.4	8.4
6.8	6.3	7.8	8.3	7.1	7.0	6.3	5.9	4.6	3.4	4.8	7.1	6.6	5.5	7.5	8.4	6.3	3.1	2.0	2.3	2.5	2.7	3.9	6.3	3.5	3.9	4.1	3.7	4.8	4.2	3.3	3.2	4.2	6.9	8.4	8.7
6.4	6.4	6.6	7.6	6.7	6.9	7.8	7.3	6.6	5.0	5.4	7.7	9.5	8.4	7.3	8.6	8.3	6.6	5.1	3.9	5.2	5.9	6.1	4.5	4.3	4.3	4.4	5.0	5.9	6.1	6.3	4.5	4.6	7.2	6.4	7.2
6.4	5.9	5.5	5.9	5.4	5.7	6.2	6.3	6.0	6.4	6.2	7.3	6.3	6.2	6.2	6.0	6.1	6.3	7.2	6.6	5.9	5.5	6.2	5.6	5.0	4.6	4.8	5.4	6.1	5.9	5.8	5.4	5.0	4.5	4.3	5.9
4.4	4.6	4.5	4.6	4.8	4.5	5.0	4.7	5.0	4.5	5.2	5.5	4.8	4.3	4.2	3.5	3.7	4.2	5.1	5.7	5.3	4.6	5.0	5.3	5.1	4.8	4.8	4.5	4.5	5.3	5.4	4.9	5.0	4.1	4.4	4.7
2.8	3.4	3.8	4.0	4.4	4.2	4.2	4.0	4.2	3.8	4.2	4.5	4.9	3.4	3.0	2.9	2.6	3.5	4.6	5.2	5.4	4.7	4.3	4.4	4.3	3.9	4.0	3.8	3.9	3.6	3.8	3.6	3.8	3.5	3.5	3.0
3.0	3.6	4.4	5.2	5.0	4.5	4.4	5.1	5.8	4.5	4.2	4.3	4.1	4.0	3.5	3.2	3.7	3.6	4.0	3.9	4.0	3.2	1.9	1.6	1.7	1.9	1.3	1.0	1.0	1.1	.8	.9	1.6	2.7	3.5	2.8
3.9	4.6	5.4	5.6	5.3	4.8	4.9	4.4	3.6	2.7	2.8	2.9	3.1	3.2	3.2	3.0	2.4	1.8	1.3	1.2	1.1	1.0	1.0	.8	1.2	1.9	1.5	1.9	1.4	1.6	2.3	2.6	3.4	4.0	3.8	3.5

Figure 60. ATOVS MEAN O-B brightness temperature differences (deg C). MAY 2003
Channel: HIRS11 (500 - 700 hPa)
NOAA17, using all observations



-.8	-.7	-.7	-.6	-.8	-1.0	-.9	-.8	-1.1	-1.3	-1.2	-1.0	-.8	-.8	-.7	-.8	-1.1	-.7	-.7	-.7	-.7	-.5	-.7	-1.2	-1.1	-.9	-.9	-1.0	-.9	-1.0	-1.1	-1.1	-1.1	-1.0	-1.1	-1.0
-.9	-.8	-.8	-1.0	-.9	-1.1	-1.6	-1.7	-1.7	-1.7	-1.8	-1.7	-1.9	-2.2	-1.9	-.6	-.8	-1.1	-1.5	-1.6	-1.3	-1.5	-1.5	-1.6	-1.4	-1.4	-1.6	-1.8	-1.5	-1.8	-1.6	-1.2	-1.1	-1.0	-1.3	-1.3
-1.8	-1.6	-2.2	-2.3	-2.4	-2.3	-1.5	-1.5	-2.0	-1.9	-1.8	-2.2	-2.0	-2.8	-1.6	-1.8	-2.0	-1.8	-1.9	-2.5	-2.2	-2.3	-1.8	-1.4	-1.6	-1.4	-1.7	-2.1	-2.0	-1.9	-2.1	-2.3	-3.0	-2.7	-3.3	-2.8
-1.6	-2.7	-2.7	-1.9	-2.2	-4.0	-4.1	-1.7	-1.2	-1.0	-1.5	-1.9	-1.4	-1.7	-1.9	-1.8	-2.2	-2.7	-2.8	-2.7	-2.7	-1.8	-1.1	-1.7	-2.1	-.6	-1.5	-2.7	-1.7	-2.3	-2.9	-3.7	-1.8	-2.3	-2.4	-2.2
-2.8	-3.1	-2.3	-2.0	-2.3	-2.6	-4.0	-3.7	-3.1	-2.9	-3.1	-3.2	-2.6	-3.2	-2.7	-1.8	-1.0	-1.4	-3.1	-4.4	-2.8	-1.3	-1.4	-1.7	-2.5	-3.1	-5.5	-5.4	-5.4	-3.3	-2.6	-2.5	-2.3	-3.3	-4.1	-4.1
-1.2	-2.1	-3.3	-1.9	-.9	-.4	-1.9	-3.2	-5.2	-5.4	-5.8	-5.2	-3.7	-2.8	.1	1.0	1.1	-1.6	-2.0	-2.1	-.9	-1.0	-2.8	-1.2	-1.4	-4.6	-6.0	-7.5	-4.7	-2.6	-3.5	-5.0	-5.7	-6.1	-4.1	-1.3
.0	-.7	-.6	.2	-1.0	-1.4	.1	-2.5	2.0	-1.4	-2.7	-1.0	-.2	-1.2	.4	.9	.4	-1.6	-1.6	.7	.4	.2	-.3	.7	.7	.6	.0	-1.9	-1.7	-1.0	-1.1	-3.4	-3.2	-1.4	-.5	-.3
-2.7	-.5	-.6	-1.7	-2.8	-2.0	-1.3	-2.6	-3.6	-5.2	-1.0	-.9	-1.4	-.8	.1	.3	-2.1	-4.7	-2.9	-2.6	-.9	1.0	-.3	1.1	1.5	-1.2	-1.9	-4.5	-5.7	-1.3	-1.2	-1.2	-1.3	-1.8	-2.9	-3.3
-5.9	-3.5	-2.2	-2.8	-1.9	-2.0	-1.7	-1.1	-3.2	-2.9	-8.0	-8.4	-6.0	-2.1	-1.9	-2.4	-4.9	-4.8	-9.0	-8.2	-6.8	-3.0	.0	-.5	-2.4	-3.5	-2.8	-8.3	-8.9	-7.3	-2.3	-3.5	-5.0	-4.3	-3.0	-4.1
-4.0	-1.5	-.3	.4	1.0	1.4	1.5	1.4	.9	.6	-3.7	-7.3	-7.1	-4.5	-1.3	.1	.9	1.0	.0	-1.9	-3.4	-1.7	-.6	-.7	-.8	-2.3	-3.9	-5.2	-4.3	-1.3	-.3	-2.1	-4.0	-4.9	-3.6	-4.2
-1.5	-2.5	-1.9	.4	.1	.6	1.2	1.4	1.0	.2	-1.3	-3.3	-3.7	-2.1	-.5	-.3	.1	.9	1.0	.4	1.1	.8	.0	-.9	-.2	.4	-.1	-1.3	-.1	.5	.8	-.1	-.9	-1.8	-2.8	-2.9
-2.7	-2.0	-3.0	-3.3	-2.1	-2.2	-1.7	-1.3	-.5	.0	-.3	-3.0	-2.3	-1.6	-1.9	-3.1	-1.6	.5	.8	1.0	.8	.7	.6	-1.4	.1	.0	.0	.2	.0	.3	.1	-.2	-.6	-2.1	-3.1	-3.9
-2.4	-2.3	-2.9	-3.9	-2.7	-3.2	-4.7	-3.8	-2.8	-1.2	-1.3	-4.2	-5.6	-5.0	-3.0	-4.2	-4.5	-2.7	-1.4	-.2	-.9	-1.4	-1.7	-.4	-.5	-.4	-.5	-.9	-1.8	-1.7	-2.1	-1.0	-1.4	-2.4	-2.0	-3.1
-3.5	-3.1	-2.8	-3.4	-2.7	-2.9	-3.7	-3.8	-3.2	-3.3	-3.2	-4.6	-3.4	-3.4	-3.4	-3.6	-3.3	-4.5	-5.1	-4.5	-3.4	-2.6	-3.3	-2.6	-2.0	-2.0	-2.7	-3.5	-3.9	-4.0	-4.0	-3.1	-2.4	-1.5	-1.3	-2.7
-3.7	-3.2	-3.1	-3.3	-3.8	-2.8	-3.0	-3.0	-3.3	-2.6	-4.1	-4.0	-3.6	-3.4	-3.4	-3.1	-3.6	-4.1	-4.5	-5.1	-4.6	-4.2	-3.9	-4.1	-4.0	-3.9	-4.3	-4.2	-4.1	-4.7	-4.9	-4.0	-4.1	-3.2	-3.5	-3.7
-3.7	-4.3	-5.3	-5.1	-5.2	-4.6	-4.2	-3.8	-4.4	-3.8	-3.9	-4.8	-5.0	-4.0	-3.6	-3.5	-3.4	-4.6	-5.7	-5.4	-5.7	-4.9	-4.9	-4.8	-4.6	-4.9	-5.1	-4.6	-4.4	-3.9	-4.1	-3.7	-3.9	-4.1	-4.3	-3.6
-4.4	-5.2	-6.6	-7.0	-6.8	-5.8	-5.3	-6.0	-7.0	-4.8	-4.5	-4.5	-4.5	-4.1	-4.0	-3.8	-4.8	-5.1	-5.8	-5.3	-4.9	-3.5	-3.3	-1.7	-1.8	-2.3	-2.7	-2.4	-2.4	-2.7	-2.3	-2.0	-2.9	-3.7	-4.8	-4.4
-6.1	-6.5	-7.1	-6.6	-5.7	-5.8	-6.3	-6.0	-3.9	-2.7	-3.8	-4.5	-4.4	-3.7	-3.7	-3.2	-3.7	-3.9	-3.8	-3.1	-2.0	-1.6	-1.5	-2.7	-1.8	-2.0	-1.7	-4.8	-3.9	-2.6	-3.3	-3.3	-5.2	-5.1	-5.8	-6.1

Figure 61. ATOVS SD O-B brightness temperature differences (deg C). MAY 2003
Channel: HIRS11 (500 - 700 hPa)
NOAA17, using all observations



2.1	2.2	2.1	2.1	2.2	2.0	1.8	1.7	1.8	2.2	2.7	2.0	1.9	2.0	2.3	2.3	2.3	1.8	1.7	1.9	2.2	2.0	2.2	2.7	2.6	2.3	2.3	2.5	2.2	2.4	2.6	2.8	2.8	2.5	2.3	2.2
2.5	2.1	2.1	2.4	2.1	2.0	2.8	2.3	2.4	2.8	2.7	2.8	2.8	2.5	1.9	2.4	2.0	1.8	2.2	2.5	2.5	2.8	2.6	3.8	3.2	2.9	2.9	3.2	2.8	3.3	3.1	3.1	3.1	3.2	3.4	3.2
3.4	3.0	3.8	4.1	4.0	4.1	3.6	3.6	3.6	3.9	3.5	4.2	3.5	4.1	3.2	3.1	3.6	3.2	3.8	4.5	4.1	4.1	4.2	3.8	4.3	3.9	4.3	4.4	4.4	4.0	4.0	4.1	4.5	4.5	6.0	5.4
3.3	4.8	4.7	3.7	4.5	5.8	6.3	4.6	4.0	3.5	3.7	4.0	3.7	4.2	4.3	4.0	4.5	4.7	5.3	6.5	6.1	5.5	4.9	5.5	5.9	4.6	5.6	6.1	5.5	5.3	5.5	6.0	4.8	5.2	5.7	4.3
5.4	6.2	5.5	4.8	4.9	5.3	6.6	6.9	7.5	6.4	6.4	6.7	6.2	6.4	5.8	5.3	4.7	5.0	6.0	7.5	6.7	6.2	6.3	5.9	6.8	7.6	9.6	8.1	7.8	7.6	7.2	6.2	5.5	6.5	6.9	6.9
4.5	6.3	7.2	5.7	4.4	4.4	6.0	8.3	10.9	10.3	9.1	8.8	7.6	7.8	3.7	2.0	2.4	5.1	7.0	7.2	5.2	5.9	8.3	5.9	6.0	9.1	9.5	9.5	7.8	6.6	7.5	8.5	9.1	9.4	7.5	5.0
4.3	5.7	4.8	3.6	5.5	6.4	5.3	7.7	6.2	6.6	8.2	5.9	5.4	6.8	3.8	3.1	4.5	6.2	5.4	5.0	4.7	5.0	4.5	2.8	2.6	3.5	6.0	7.7	6.1	6.8	5.7	8.2	7.8	6.5	5.2	4.7
8.8	5.2	5.3	5.9	7.6	7.4	7.2	8.2	9.0	10.4	6.5	6.0	6.5	5.1	4.3	4.1	6.1	7.9	7.2	6.8	6.1	5.3	4.3	3.1	3.5	7.2	7.8	10.2	10.4	7.2	8.2	7.6	6.9	8.1	8.1	9.2
11.9	9.9	8.6	9.2	8.5	8.7	8.6	8.0	10.8	9.5	12.4	11.5	10.4	8.1	7.6	8.9	11.5	11.0	13.7	11.8	12.9	9.4	6.1	6.2	9.1	8.8	8.4	10.8	12.1	10.8	7.8	9.5	10.7	10.4	7.7	9.6
9.4	7.3	5.7	4.3	2.5	1.4	1.0	1.2	1.4	2.0	8.2	11.3	9.7	8.2	5.9	4.8	3.2	3.2	5.8	8.7	9.5	6.8	6.5	6.4	6.2	7.9	9.3	9.6	9.8	6.8	5.4	7.7	9.1	10.6	8.8	9.2
7.8	9.8	8.9	6.0	4.7	3.5	2.2	1.5	2.4	4.0	5.3	8.6	8.1	5.4	5.4	5.8	4.6	2.8	3.0	3.1	3.2	3.7	4.9	6.8	5.5	4.8	4.6	7.0	5.6	3.2	2.7	4.0	4.7	6.9	8.8	8.6
6.5	6.5	8.1	8.6	7.3	7.5	6.7	6.0	4.9	4.4	6.0	9.2	8.6	7.1	8.2	8.6	6.8	4.1	2.8	3.2	3.0	3.2	4.4	6.8	4.1	4.8	4.1	3.5	5.1	3.7	3.1	3.1	3.9	6.6	8.1	8.8
6.9	6.7	7.1	8.2	7.3	7.3	8.3	7.6	7.1	5.6	6.6	9.4	10.9	9.4	8.0	9.2	8.7	7.3	6.1	4.4	5.8	6.7	6.9	5.0	4.7	4.6	4.7	5.7	6.7	6.1	6.4	4.7	4.7	7.6	7.1	8.0
7.0	6.5	6.1	6.7	6.1	6.3	7.0	7.0	6.9	7.2	7.2	8.7	7.2	7.1	7.2	7.0	7.2	7.5	8.5	7.7	7.2	6.5	7.0	6.4	5.8	5.6	5.9	6.8	7.3	6.8	6.6	6.1	5.8	5.1	4.7	6.5
5.9	5.9	5.5	5.7	5.8	5.5	5.9	5.6	6.0	5.6	6.6	7.0	6.1	5.6	5.7	4.8	5.2	5.6	6.5	7.0	6.5	5.7	6.1	6.7	6.2	6.1	6.1	5.9	5.9	7.1	6.7	6.2	6.1	5.1	5.8	6.1
4.0	4.9	5.2	5.3	5.9	5.5	5.5	5.2	5.3	5.1	5.8	6.4	6.8	4.8	4.3	4.3	4.0	5.0	6.3	7.1	7.1	6.1	5.7	5.8	5.6	5.2	5.2	5.0	5.0	5.0	5.1	4.7	5.0	4.9	4.9	4.1
4.6	5.3	6.4	7.6	7.3	6.5	6.0	7.0	8.0	6.3	6.0	6.5	5.9	5.9	5.3	5.0	6.0	5.8	6.3	6.2	6.0	4.8	3.6	3.1	3.4	4.0	2.7	2.3	2.4	2.2	2.1	2.2	2.9	4.6	6.1	4.4
6.3	7.1	8.5	8.7	8.1	7.4	7.4	6.6	5.8	4.6	4.6	4.8	5.2	5.3	5.2	5.1	4.2	3.4	3.0	3.0	3.2	3.0	3.2	2.5	2.9	3.5	2.8	3.4	3.6	3.3	4.0	4.4	5.6	6.9	6.4	5.8

Figure 62. ATOVS MEAN O-B brightness temperature differences (deg C). MAY 2003
Channel: HIRS4 (400 hPa)
NOAA17, using all observations

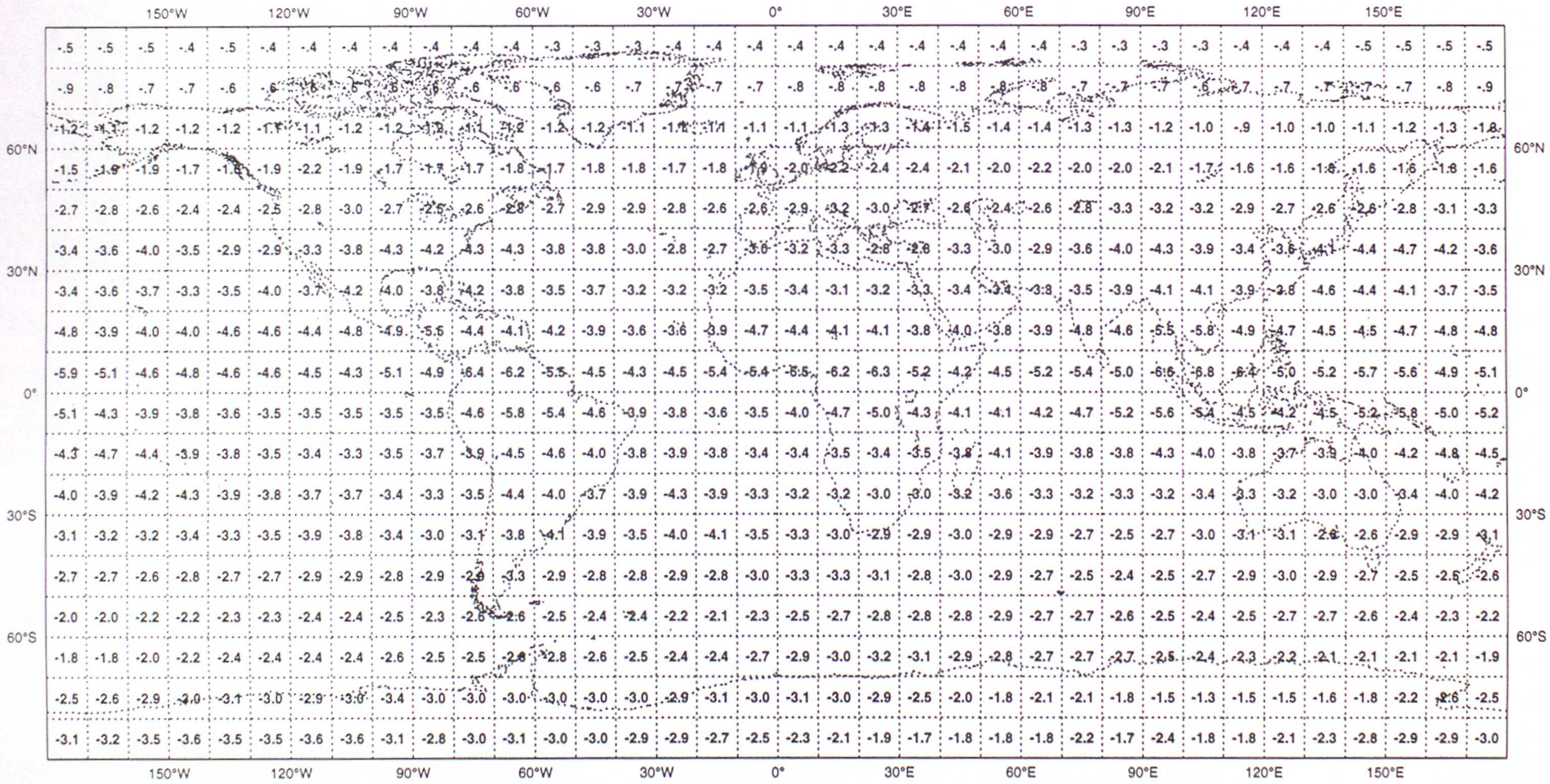

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
-.5 -.5 -.5 -.4 -.5 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.3 -.3 -.3 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.3 -.3 -.3 -.3 -.4 -.4 -.4 -.5 -.5 -.5 -.5
-.9 -.8 -.7 -.7 -.6 -.6 -.6 -.5 -.5 -.6 -.6 -.6 -.6 -.6 -.7 -.7 -.7 -.7 -.8 -.8 -.8 -.8 -.8 -.8 -.8 -.7 -.7 -.7 -.6 -.7 -.7 -.7 -.7 -.7 -.8 -.9
-1.2 -1.1 -1.2 -1.2 -1.2 -1.1 -1.1 -1.2 -1.2 -1.2 -1.1 -1.2 -1.2 -1.2 -1.1 -1.1 -1.1 -1.1 -1.1 -1.3 -1.3 -1.4 -1.5 -1.4 -1.4 -1.3 -1.3 -1.2 -1.0 -.9 -1.0 -1.0 -1.1 -1.2 -1.3 -1.8
-1.5 -1.9 -1.9 -1.7 -1.8 -1.9 -2.2 -1.9 -1.7 -1.7 -1.7 -1.8 -1.7 -1.8 -1.8 -1.7 -1.8 -1.9 -2.0 -2.2 -2.4 -2.4 -2.1 -2.0 -2.2 -2.0 -2.0 -2.1 -1.7 -1.6 -1.6 -1.8 -1.6 -1.6 -1.8 -1.6
-2.7 -2.8 -2.6 -2.4 -2.4 -2.5 -2.8 -3.0 -2.7 -2.5 -2.6 -2.8 -2.7 -2.9 -2.9 -2.8 -2.6 -2.6 -2.9 -3.2 -3.0 -2.7 -2.6 -2.4 -2.6 -2.8 -3.3 -3.2 -3.2 -2.9 -2.7 -2.6 -2.6 -2.8 -3.1 -3.3
-3.4 -3.6 -4.0 -3.5 -2.9 -2.9 -3.3 -3.8 -4.3 -4.2 -4.3 -4.3 -3.8 -3.8 -3.0 -2.8 -2.7 -3.0 -3.2 -3.3 -2.8 -2.8 -3.3 -3.0 -2.9 -3.6 -4.0 -4.3 -3.9 -3.4 -3.6 -4.1 -4.4 -4.7 -4.2 -3.6
-3.4 -3.6 -3.7 -3.3 -3.5 -4.0 -3.7 -4.2 -4.0 -3.8 -4.2 -3.8 -3.5 -3.7 -3.2 -3.2 -3.2 -3.5 -3.4 -3.1 -3.2 -3.3 -3.4 -3.4 -3.8 -3.5 -3.9 -4.1 -4.1 -3.9 -3.8 -4.6 -4.4 -4.1 -3.7 -3.5
-4.8 -3.9 -4.0 -4.0 -4.6 -4.6 -4.4 -4.8 -4.9 -5.5 -4.4 -4.1 -4.2 -3.9 -3.6 -3.6 -3.9 -4.7 -4.4 -4.1 -4.1 -3.8 -4.0 -3.8 -3.9 -4.8 -4.6 -5.5 -5.8 -4.9 -4.7 -4.5 -4.5 -4.7 -4.8 -4.8
-5.9 -5.1 -4.6 -4.8 -4.6 -4.6 -4.5 -4.3 -5.1 -4.9 -6.4 -6.2 -5.5 -4.5 -4.3 -4.5 -5.4 -5.4 -6.5 -6.2 -6.3 -5.2 -4.2 -4.5 -5.2 -5.4 -5.0 -6.6 -6.8 -6.4 -5.0 -5.2 -5.7 -5.6 -4.9 -5.1
-5.1 -4.3 -3.9 -3.8 -3.6 -3.5 -3.5 -3.5 -3.5 -3.5 -4.6 -5.8 -5.4 -4.6 -3.9 -3.8 -3.6 -3.5 -4.0 -4.7 -5.0 -4.3 -4.1 -4.1 -4.2 -4.7 -5.2 -5.6 -5.4 -4.5 -4.2 -4.5 -5.2 -5.8 -5.0 -5.2
-4.3 -4.7 -4.4 -3.9 -3.8 -3.5 -3.4 -3.3 -3.5 -3.7 -3.9 -4.5 -4.6 -4.0 -3.8 -3.9 -3.8 -3.4 -3.4 -3.5 -3.4 -3.5 -3.8 -4.1 -3.9 -3.8 -3.8 -4.3 -4.0 -3.8 -3.7 -3.9 -4.0 -4.2 -4.8 -4.5
-4.0 -3.9 -4.2 -4.3 -3.9 -3.8 -3.7 -3.7 -3.4 -3.3 -3.5 -4.4 -4.0 -3.7 -3.9 -4.3 -3.9 -3.3 -3.2 -3.2 -3.0 -3.0 -3.2 -3.6 -3.3 -3.2 -3.3 -3.2 -3.4 -3.3 -3.2 -3.0 -3.0 -3.4 -4.0 -4.2
-3.1 -3.2 -3.2 -3.4 -3.3 -3.5 -3.9 -3.8 -3.4 -3.0 -3.1 -3.8 -4.1 -3.9 -3.5 -4.0 -4.1 -3.5 -3.3 -3.0 -2.9 -2.9 -3.0 -2.9 -2.9 -2.7 -2.5 -2.7 -3.0 -3.1 -3.1 -2.6 -2.6 -2.9 -2.9 -3.1
-2.7 -2.7 -2.6 -2.8 -2.7 -2.7 -2.9 -2.9 -2.8 -2.9 -2.9 -3.3 -2.9 -2.8 -2.8 -2.9 -2.8 -3.0 -3.3 -3.3 -3.1 -2.8 -3.0 -2.9 -2.7 -2.5 -2.4 -2.5 -2.7 -2.9 -3.0 -2.9 -2.7 -2.5 -2.5 -2.6
-2.0 -2.0 -2.2 -2.2 -2.3 -2.3 -2.4 -2.4 -2.5 -2.3 -2.6 -2.6 -2.5 -2.4 -2.4 -2.2 -2.1 -2.3 -2.5 -2.7 -2.8 -2.8 -2.8 -2.9 -2.7 -2.7 -2.6 -2.5 -2.4 -2.5 -2.7 -2.7 -2.6 -2.4 -2.3 -2.2
-1.8 -1.8 -2.0 -2.2 -2.4 -2.4 -2.4 -2.4 -2.6 -2.5 -2.5 -2.8 -2.8 -2.6 -2.5 -2.4 -2.4 -2.7 -2.9 -3.0 -3.2 -3.1 -2.9 -2.8 -2.7 -2.7 -2.7 -2.5 -2.4 -2.3 -2.2 -2.1 -2.1 -2.1 -2.1 -1.9
-2.5 -2.6 -2.9 -3.0 -3.1 -3.0 -2.9 -3.0 -3.4 -3.0 -3.0 -3.0 -3.0 -3.0 -3.0 -2.9 -3.1 -3.0 -3.1 -3.0 -2.9 -2.5 -2.0 -1.8 -2.1 -2.1 -1.8 -1.5 -1.3 -1.5 -1.5 -1.6 -1.8 -2.2 -2.6 -2.5
-3.1 -3.2 -3.5 -3.6 -3.5 -3.5 -3.6 -3.6 -3.1 -2.8 -3.0 -3.1 -3.0 -3.0 -2.9 -2.9 -2.7 -2.5 -2.3 -2.1 -1.9 -1.7 -1.8 -1.8 -1.8 -2.2 -1.7 -2.4 -1.8 -1.8 -2.1 -2.3 -2.8 -2.9 -2.9 -3.0

Figure 63. ATOVS SD O-B brightness temperature differences (deg C). MAY 2003
Channel: HIRS4 (400 hPa)
NOAA17, using all observations

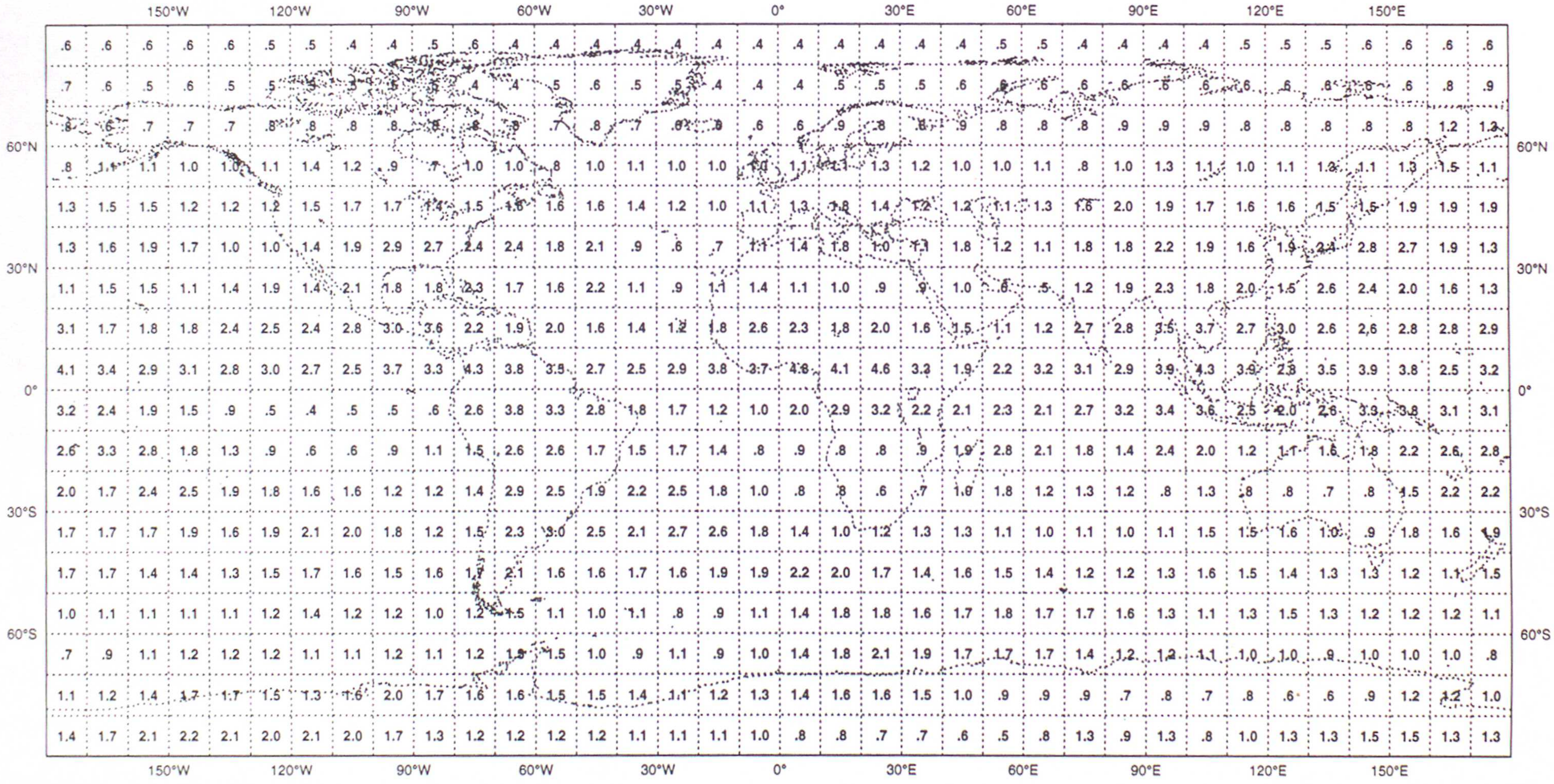

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 64. ATOVS MEAN O-B brightness temperature differences (deg C). MAY 2003
Channel: AMSUA-5 (700 hPa)
NOAA17, using all observations

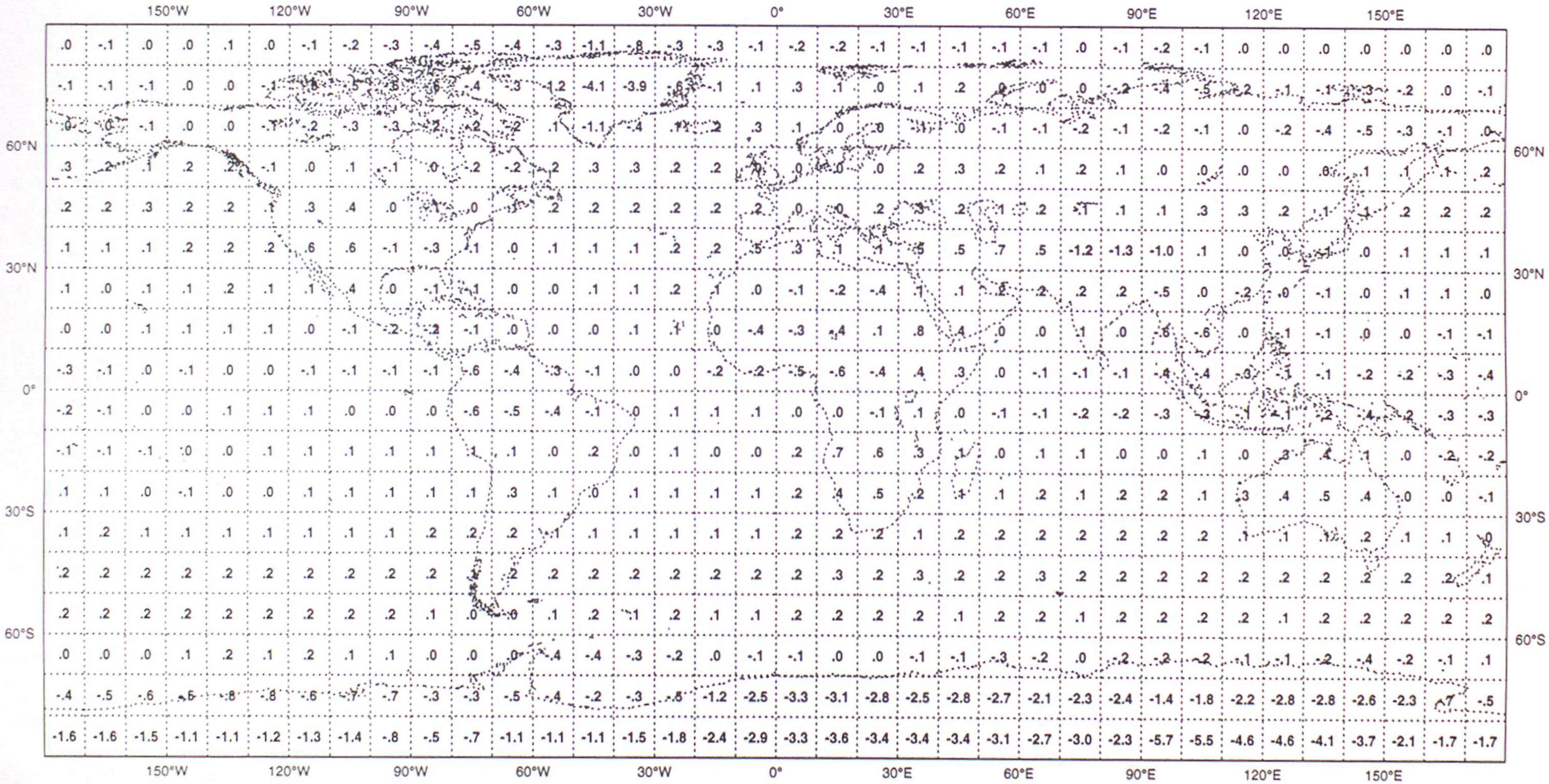

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 65. ATOVS SD O-B brightness temperature differences (deg C). MAY 2003
Channel: AMSUA-5 (700 hPa)
NOAA17, using all observations

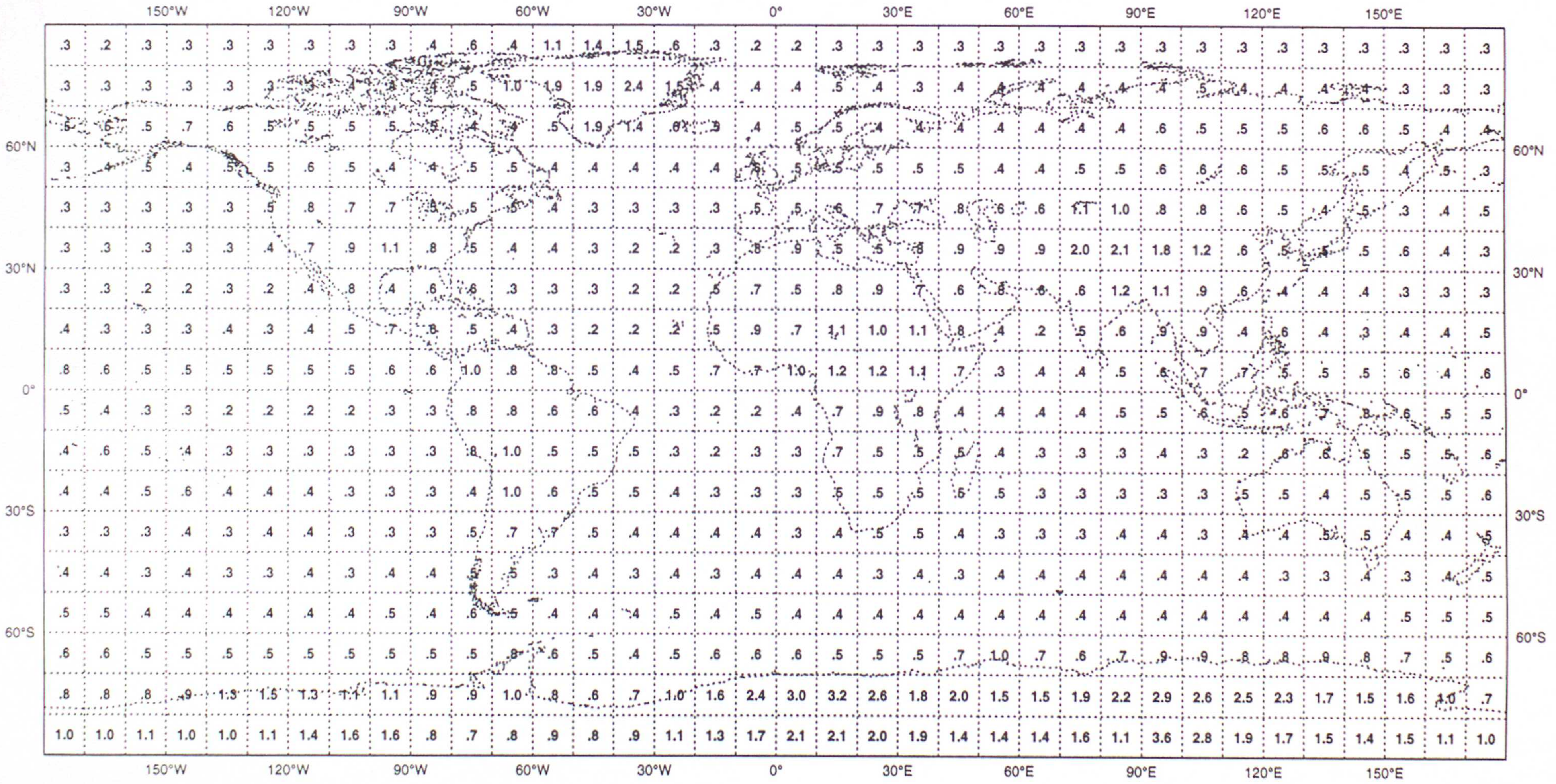

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
.3 .2 .3 .3 .3 .3 .3 .3 .3 .4 .6 .4 1.1 1.4 1.5 .6 .3 .2 .2 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3
.3 .3 .3 .3 .3 .3 .3 .4 .3 .4 .5 1.0 1.9 1.9 2.4 1.5 .4 .4 .4 .5 .4 .3 .4 .4 .4 .4 .4 .4 .5 .4 .4 .4 .4 .3 .3 .3
.5 .6 .5 .7 .6 .5 .5 .5 .5 .5 .4 .4 .5 1.9 1.4 .6 .5 .4 .5 .5 .4 .4 .4 .4 .4 .4 .4 .6 .5 .5 .5 .6 .6 .5 .4 .4
.3 .4 .5 .4 .5 .5 .6 .5 .4 .4 .5 .5 .4 .4 .4 .4 .4 .5 .5 .5 .5 .5 .5 .4 .4 .5 .5 .6 .6 .6 .5 .5 .5 .4 .5 .3
.3 .3 .3 .3 .3 .5 .8 .7 .7 .5 .5 .5 .4 .3 .3 .3 .3 .5 .5 .6 .7 .7 .8 .6 .6 1.1 1.0 .8 .8 .6 .5 .4 .5 .3 .4 .5
.3 .3 .3 .3 .3 .4 .7 .9 1.1 .8 .5 .4 .4 .3 .2 .2 .3 .8 .9 .5 .5 .8 .9 .9 .9 2.0 2.1 1.8 1.2 .6 .5 .5 .5 .6 .4 .3
.3 .3 .2 .2 .3 .2 .4 .8 .4 .6 .6 .3 .3 .3 .2 .2 .5 .7 .5 .8 .9 .7 .6 .8 .6 .6 1.2 1.1 .9 .6 .4 .4 .4 .3 .3 .3
.4 .3 .3 .3 .4 .3 .4 .5 .7 .8 .5 .4 .3 .2 .2 .2 .5 .9 .7 1.1 1.0 1.1 .8 .4 .2 .5 .6 .9 .9 .4 .6 .4 .3 .4 .4 .5
.8 .6 .5 .5 .5 .5 .5 .5 .6 .6 1.0 .8 .8 .5 .4 .5 .7 .7 1.0 1.2 1.2 1.1 .7 .3 .4 .4 .5 .6 .7 .7 .5 .5 .5 .6 .4 .6
.5 .4 .3 .3 .2 .2 .2 .2 .3 .3 .8 .8 .6 .6 .4 .3 .2 .2 .4 .7 .9 .8 .4 .4 .4 .4 .5 .5 .6 .5 .6 .7 .8 .6 .5 .5
.4 .6 .5 .4 .3 .3 .3 .3 .3 .3 .8 1.0 .5 .5 .5 .3 .2 .3 .3 .7 .5 .5 .5 .4 .3 .3 .3 .4 .3 .2 .6 .6 .5 .5 .5 .6
.4 .4 .5 .6 .4 .4 .4 .3 .3 .3 .4 1.0 .6 .5 .5 .4 .3 .3 .3 .5 .5 .5 .5 .5 .3 .3 .3 .3 .3 .5 .5 .4 .5 .5 .5 .6
.3 .3 .3 .4 .3 .4 .4 .3 .3 .3 .5 .7 .7 .5 .4 .4 .4 .4 .3 .4 .5 .5 .4 .3 .3 .3 .4 .4 .3 .4 .4 .5 .5 .4 .4 .5
.4 .4 .3 .4 .3 .3 .4 .3 .4 .4 .5 .5 .3 .4 .3 .4 .3 .4 .4 .4 .3 .4 .3 .4 .4 .4 .4 .4 .4 .4 .3 .3 .4 .3 .4 .5
.5 .5 .4 .4 .4 .4 .4 .4 .5 .4 .6 .5 .4 .4 .4 .5 .4 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .5 .5
.6 .6 .5 .5 .5 .5 .5 .5 .5 .5 .5 .8 .6 .5 .4 .5 .6 .6 .6 .5 .5 .5 .7 1.0 .7 .6 .7 .9 .9 .8 .8 .9 .8 .7 .5 .6
.8 .8 .8 .9 1.3 1.5 1.3 1.1 1.1 .9 .9 1.0 .8 .6 .7 1.0 1.6 2.4 3.0 3.2 2.6 1.8 2.0 1.5 1.5 1.9 2.2 2.9 2.6 2.5 2.3 1.7 1.5 1.6 1.0 .7
1.0 1.0 1.1 1.0 1.0 1.1 1.4 1.6 1.6 .8 .7 .8 .9 .8 .9 1.1 1.3 1.7 2.1 2.1 2.0 1.9 1.4 1.4 1.4 1.6 1.1 3.6 2.8 1.9 1.7 1.5 1.4 1.5 1.1 1.0

Figure 66. ATOVS MEAN O-B brightness temperature differences (deg C). MAY 2003
Channel: AMSUA-7 (300 hPa)
NOAA17, using all observations

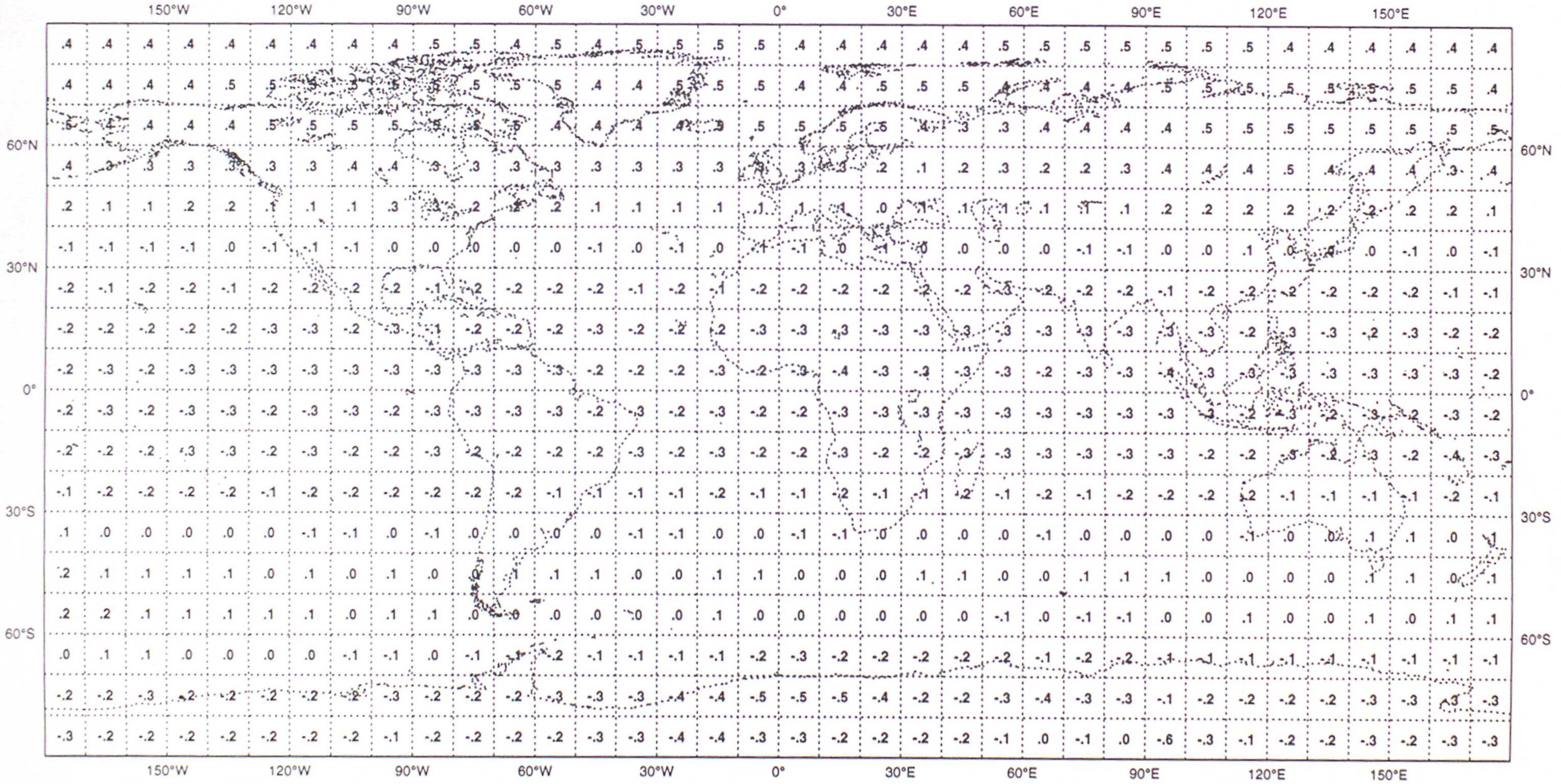

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
.4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .5 .4 .5 .4 .5 .5 .5 .5 .4 .4 .4 .4 .4 .5 .5 .5 .5 .5 .5 .5 .4 .4 .4 .4 .4 .4
.4 .4 .4 .4 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .4 .5 .5 .5 .4 .4 .5 .5 .5 .4 .4 .4 .4 .5 .5 .5 .5 .5 .5 .5 .5 .4
.5 .4 .4 .4 .4 .5 .5 .5 .5 .5 .5 .5 .4 .4 .4 .4 .3 .5 .5 .5 .5 .4 .3 .3 .4 .4 .4 .4 .5 .5 .5 .5 .5 .5 .5 .5
.4 .3 .3 .3 .3 .3 .3 .4 .4 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .2 .1 .2 .3 .2 .2 .3 .4 .4 .4 .5 .4 .4 .4 .3 .4
.2 .1 .1 .2 .2 .1 .1 .1 .3 .3 .2 .2 .2 .1 .1 .1 .1 .1 .1 .1 .0 .1 .1 .1 .1 .1 .1 .2 .2 .2 .2 .2 .2 .2 .2 .1
-.1 -.1 -.1 -.1 .0 -.1 -.1 -.1 .0 .0 .0 .0 .0 -.1 .0 -.1 .0 -.1 -.1 .0 -.1 .0 .0 .0 .0 -.1 -.1 .0 .0 .1 .0 .0 .0 -.1 .0 -.1
-.2 -.1 -.2 -.2 -.1 -.2 -.2 -.2 -.2 -.1 -.2 -.2 -.2 -.2 -.1 -.2 -.1 -.2 -.2 -.2 -.2 -.2 -.2 -.3 -.2 -.2 -.2 -.1 -.2 -.2 -.2 -.2 -.2 -.2 -.1 -.1
-.2 -.2 -.2 -.2 -.2 -.3 -.3 -.2 -.3 -.1 -.2 -.2 -.2 -.3 -.2 -.2 -.2 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.2 -.3 -.3 -.2 -.3 -.2 -.2
-.2 -.3 -.2 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.2 -.2 -.2 -.3 -.2 -.3 -.4 -.3 -.3 -.3 -.3 -.2 -.3 -.3 -.4 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.2
-.2 -.3 -.2 -.3 -.3 -.2 -.3 -.3 -.2 -.3 -.3 -.3 -.3 -.2 -.3 -.2 -.3 -.2 -.2 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.2 -.3 -.2 -.3 -.2 -.3 -.2
-.2 -.2 -.2 -.3 -.3 -.2 -.3 -.2 -.2 -.3 -.2 -.2 -.2 -.2 -.3 -.2 -.3 -.2 -.2 -.3 -.2 -.2 -.3 -.3 -.3 -.3 -.3 -.3 -.2 -.2 -.3 -.2 -.3 -.2 -.4 -.3
-.1 -.2 -.2 -.2 -.2 -.1 -.2 -.2 -.2 -.2 -.2 -.2 -.1 -.1 -.1 -.1 -.2 -.1 -.1 -.2 -.1 -.1 -.2 -.1 -.2 -.1 -.2 -.2 -.2 -.2 -.1 -.1 -.1 -.1 -.2 -.1
.1 .0 .0 .0 .0 .0 -.1 -.1 .0 -.1 .0 .0 .0 .0 -.1 -.1 .0 .0 -.1 -.1 .0 .0 .0 .0 -.1 .0 .0 .0 .0 -.1 .0 .0 .1 .1 .0 .1
.2 .1 .1 .1 .1 .0 .1 .0 .1 .0 .0 .1 .1 .1 .0 .0 .1 .1 .0 .0 .0 .1 .1 .0 .0 .1 .1 .1 .0 .0 .0 .0 .1 .1 .0 .1
.2 .2 .1 .1 .1 .1 .1 .0 .1 .1 .0 .0 .0 .0 .0 .0 .1 .0 .0 .0 .0 .0 .0 -.1 .0 -.1 -.1 .0 .0 .1 .0 .0 .1 .0 .1 .1
.0 .1 .1 .0 .0 .0 .0 -.1 -.1 .0 -.1 -.1 -.2 -.1 -.1 -.1 -.1 -.2 -.3 -.2 -.2 -.2 -.2 -.2 -.1 -.2 -.2 -.1 -.1 -.1 -.1 -.1 -.1 -.1 -.1 -.1
-.2 -.2 -.3 -.2 -.2 -.2 -.2 -.2 -.3 -.2 -.2 -.2 -.3 -.3 -.3 -.4 -.4 -.5 -.5 -.5 -.4 -.2 -.2 -.3 -.4 -.3 -.3 -.1 -.2 -.2 -.2 -.2 -.3 -.3 -.3 -.3
-.3 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.1 -.2 -.2 -.2 -.2 -.3 -.3 -.4 -.4 -.3 -.3 -.2 -.2 -.2 -.2 -.1 .0 -.1 .0 -.6 -.3 -.1 -.2 -.2 -.3 -.2 -.3 -.3
60°N
30°N
0°
30°S
60°S
150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E

Figure 67. ATOVS SD O-B brightness temperature differences (deg C). MAY 2003
Channel: AMSUA-7 (300 hPa)
NOAA17, using all observations

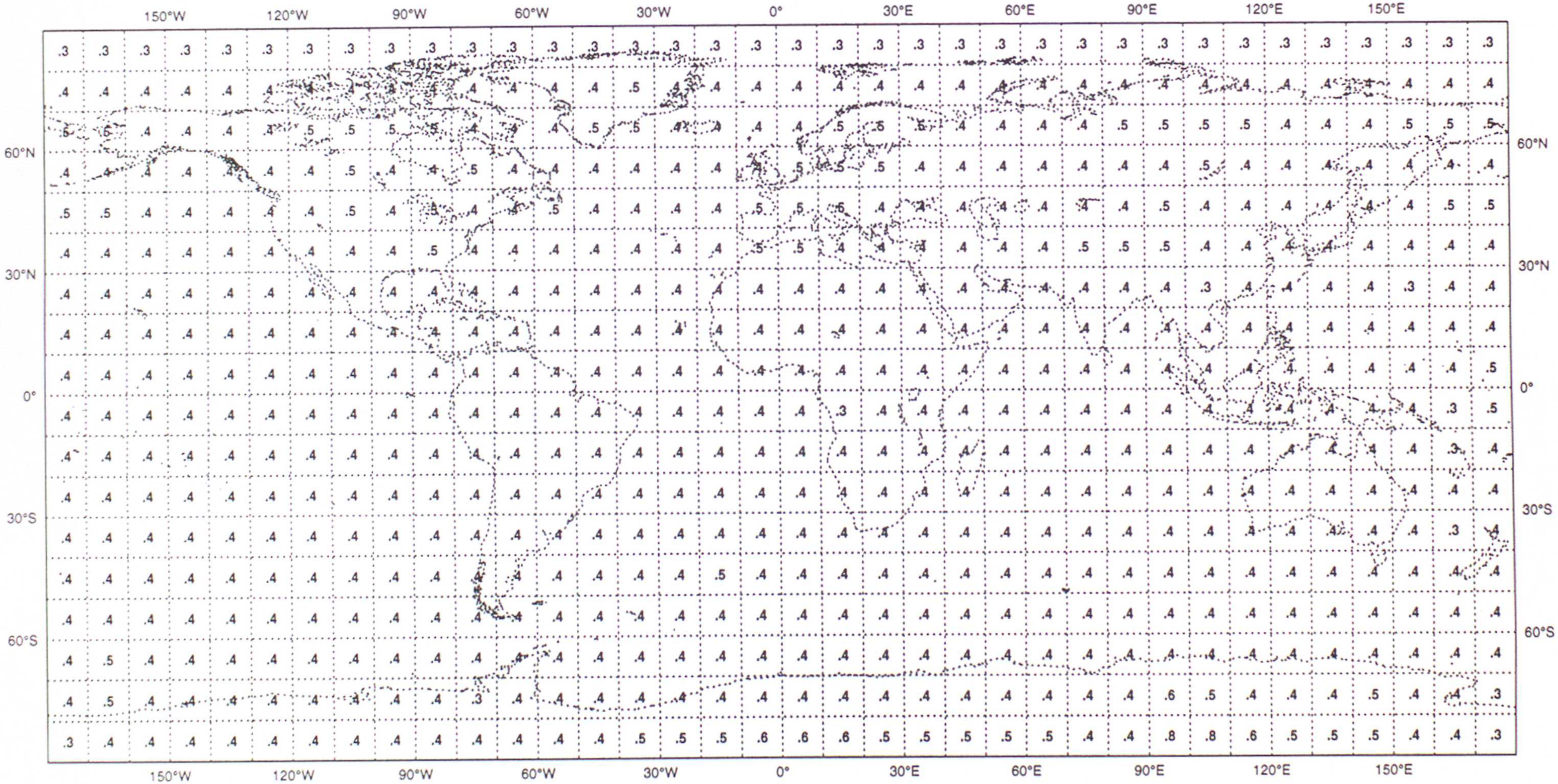
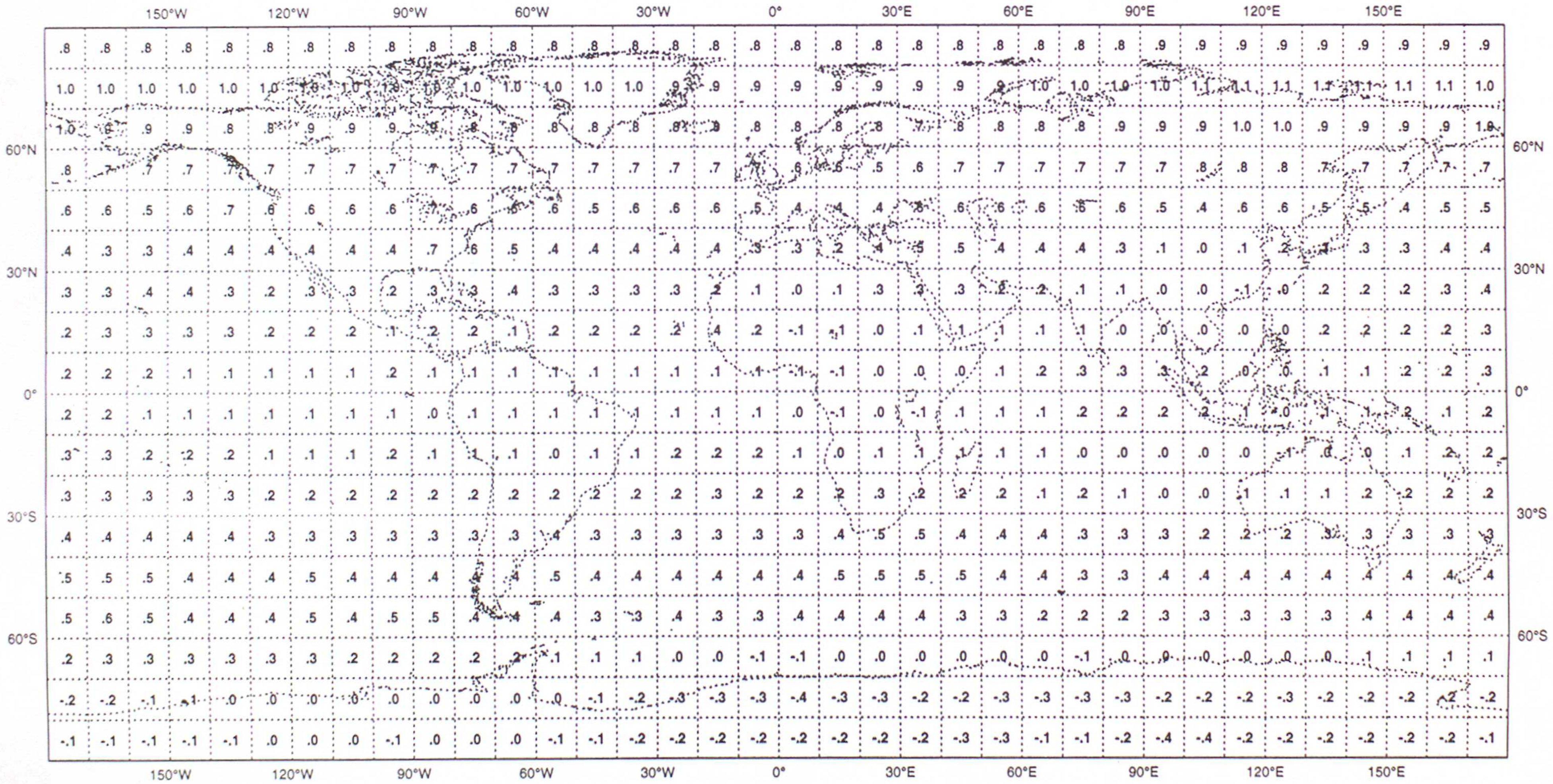

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 68. ATOVS MEAN O-B brightness temperature differences (deg C). MAY 2003
Channel: AMSUA-9 (100 hPa)
NOAA17, using all observations



.8	.8	.8	.8	.8	.8	.8	.8	.8	.8	.8	.8	.8	.8	.8	.8	.8	.8	.8	.8	.8	.8	.8	.8	.8	.8	.8	.9	.9	.9	.9	.9	.9	.9	.9	.9
1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	.9	.9	.9	.9	.9	.9	.9	.9	.9	1.0	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.0
1.0	.8	.9	.9	.8	.8	.9	.9	.9	.9	.8	.8	.8	.8	.8	.8	.9	.8	.8	.8	.8	.7	.8	.8	.8	.8	.9	.9	.9	1.0	1.0	.9	.9	.9	.9	1.0
.8	.7	.7	.7	.7	.7	.7	.7	.7	.7	.7	.7	.7	.7	.7	.7	.7	.7	.6	.5	.5	.6	.7	.7	.7	.7	.7	.7	.8	.8	.8	.7	.7	.7	.7	.7
.6	.6	.5	.6	.7	.6	.6	.6	.6	.7	.6	.6	.6	.5	.6	.6	.6	.5	.4	.4	.4	.8	.6	.6	.6	.6	.6	.5	.4	.6	.6	.5	.5	.4	.5	.5
.4	.3	.3	.4	.4	.4	.4	.4	.4	.7	.6	.5	.4	.4	.4	.4	.4	.3	.3	.2	.4	.5	.5	.4	.4	.4	.3	.1	.0	.1	.2	.1	.3	.3	.4	.4
.3	.3	.4	.4	.3	.2	.3	.3	.2	.3	.3	.4	.3	.3	.3	.3	.2	.1	.0	.1	.3	.3	.3	.2	.2	.1	.1	.0	.0	-.1	.0	.2	.2	.2	.3	.4
.2	.3	.3	.3	.3	.2	.2	.2	.1	.2	.2	.1	.2	.2	.2	.2	.4	.2	-.1	-.1	.0	.1	.1	.1	.1	.1	.0	.0	.0	.0	.0	.2	.2	.2	.2	.3
.2	.2	.2	.1	.1	.1	.1	.1	.2	.1	.1	.1	.1	.1	.1	.1	.1	.1	-.1	-.1	.0	.0	.0	.1	.2	.3	.3	.3	.2	.0	.0	.1	.1	.2	.2	.3
.2	.2	.1	.1	.1	.1	.1	.1	.1	.0	.1	.1	.1	.1	.1	.1	.1	.1	.0	-.1	.0	-.1	.1	.1	.1	.2	.2	.2	.2	.1	.0	.1	.1	.2	.1	.2
.3	.3	.2	.2	.2	.1	.1	.1	.2	.1	.1	.1	.0	.1	.1	.2	.2	.2	.1	.0	.1	.1	.1	.1	.1	.0	.0	.0	.0	.0	-.1	.0	.0	.1	.2	.2
.3	.3	.3	.3	.3	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.3	.2	.2	.2	.3	.2	.2	.2	.1	.2	.1	.0	.0	.1	.1	.1	.2	.2	.2	.2
.4	.4	.4	.4	.4	.3	.3	.3	.3	.3	.3	.3	.4	.3	.3	.3	.3	.3	.3	.4	.5	.5	.4	.4	.4	.3	.3	.3	.2	.2	.2	.3	.3	.3	.3	.3
.5	.5	.5	.4	.4	.4	.5	.4	.4	.4	.4	.4	.5	.4	.4	.4	.4	.4	.4	.5	.5	.5	.5	.4	.4	.3	.3	.4	.4	.4	.4	.4	.4	.4	.4	.4
.5	.6	.5	.4	.4	.4	.5	.4	.5	.5	.4	.4	.4	.3	.3	.4	.3	.3	.4	.4	.4	.4	.3	.3	.2	.2	.2	.3	.3	.3	.3	.3	.4	.4	.4	.4
.2	.3	.3	.3	.3	.3	.3	.2	.2	.2	.2	.2	.1	.1	.1	.0	.0	-.1	-.1	.0	.0	.0	.0	.0	.0	-.1	.0	.0	.0	.0	.0	.0	.1	.1	.1	.1
-.2	-.2	-.1	-.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	-.1	-.2	-.3	-.3	-.3	-.4	-.3	-.3	-.2	-.2	-.3	-.3	-.3	-.3	-.2	-.2	-.2	-.3	-.2	-.2	-.2	-.2	-.2
-.1	-.1	-.1	-.1	-.1	.0	.0	.0	-.1	.0	.0	.0	-.1	-.1	-.1	-.2	-.2	-.2	-.2	-.2	-.2	-.2	-.2	-.3	-.3	-.1	-.1	-.2	-.4	-.4	-.2	-.2	-.2	-.2	-.2	-.2	-.1

Figure 69. ATOVS SD O-B brightness temperature differences (deg C). MAY 2003
Channel: AMSUA-9 (100 hPa)
NOAA17, using all observations

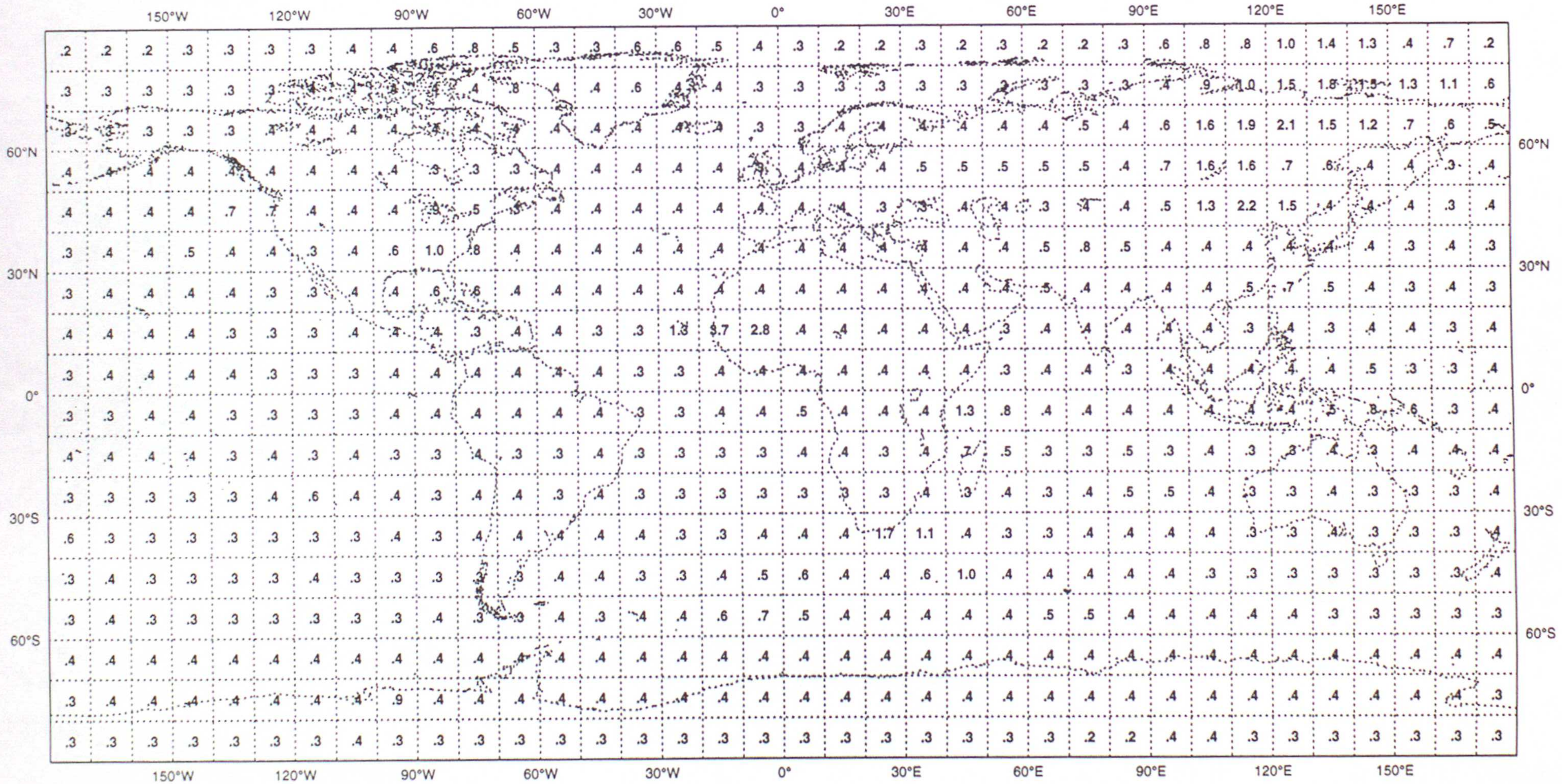

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
.2 .2 .2 .3 .3 .3 .3 .4 .4 .6 .8 .5 .3 .3 .6 .6 .5 .4 .3 .2 .2 .3 .2 .3 .2 .2 .3 .6 .8 .8 1.0 1.4 1.3 .4 .7 .2
.3 .3 .3 .3 .3 .3 .4 .4 .3 .4 .4 .8 .4 .4 .6 .4 .4 .3 .3 .3 .3 .3 .3 .2 .3 .3 .3 .4 .9 1.0 1.5 1.8 1.5 1.3 1.1 .6
.3 .3 .3 .3 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .3 .4 .4 .4 .4 .4 .4 .5 .4 .6 1.6 1.9 2.1 1.5 1.2 .7 .6 .5
.4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .3 .3 .4 .4 .4 .4 .4 .3 .4 .4 .4 .5 .5 .5 .5 .5 .4 .7 1.6 1.6 .7 .6 .4 .4 .3 .4
.4 .4 .4 .4 .7 .7 .4 .4 .4 .3 .5 .5 .4 .4 .4 .4 .4 .4 .4 .4 .3 .3 .4 .4 .3 .4 .4 .5 1.3 2.2 1.5 .4 .4 .4 .3 .4
.3 .4 .4 .5 .4 .4 .3 .4 .6 1.0 .8 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .8 .5 .4 .4 .4 .4 .4 .4 .3 .4 .3
.3 .4 .4 .4 .4 .3 .3 .4 .4 .6 .6 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .4 .4 .4 .4 .5 .7 .5 .4 .3 .4 .3
.4 .4 .4 .4 .3 .3 .3 .4 .4 .4 .3 .4 .4 .3 .3 1.3 3.7 2.8 .4 .4 .4 .4 .4 .3 .4 .4 .4 .4 .4 .3 .4 .3 .4 .4 .3 .4
.3 .4 .4 .4 .4 .3 .3 .3 .4 .4 .4 .4 .4 .4 .3 .3 .4 .4 .4 .4 .4 .4 .4 .3 .4 .4 .3 .4 .4 .4 .4 .4 .5 .3 .3 .4
.3 .3 .4 .4 .3 .3 .3 .3 .4 .4 .4 .4 .4 .4 .3 .3 .4 .4 .5 .4 .4 .4 1.3 .8 .4 .4 .4 .4 .4 .4 .4 .5 .8 .6 .3 .4
.4 .4 .4 .4 .3 .4 .3 .4 .3 .3 .4 .3 .3 .4 .3 .3 .3 .3 .4 .4 .3 .4 .7 .5 .3 .3 .5 .3 .4 .3 .3 .4 .3 .4 .4 .4
.3 .3 .3 .3 .3 .4 .6 .4 .4 .3 .4 .4 .3 .4 .3 .3 .3 .3 .3 .3 .3 .4 .3 .4 .3 .4 .5 .5 .4 .3 .3 .4 .3 .3 .3 .4
.6 .3 .3 .3 .3 .3 .3 .3 .4 .3 .4 .4 .4 .4 .4 .3 .3 .4 .4 .4 1.7 1.1 .4 .3 .3 .4 .4 .4 .4 .3 .3 .4 .3 .3 .3 .4
.3 .4 .3 .3 .3 .3 .4 .3 .3 .3 .3 .3 .4 .4 .3 .3 .4 .5 .6 .4 .4 .6 1.0 .4 .4 .4 .4 .4 .3 .3 .3 .3 .3 .3 .3 .4
.3 .4 .3 .3 .3 .3 .3 .3 .3 .4 .3 .3 .4 .3 .4 .4 .6 .7 .5 .4 .4 .4 .4 .4 .5 .5 .4 .4 .4 .4 .4 .3 .3 .3 .3 .3
.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4
.3 .4 .4 .4 .4 .4 .4 .4 .9 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3
.3 .3 .3 .3 .3 .3 .3 .4 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .2 .2 .4 .4 .3 .3 .3 .3 .3 .3 .3
150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S

TABLE 8

MONTHLY MONITORING OF MARINE SURFACE OBSERVATIONS (COSNA)
DATA TYPE:- DRIFTER
MONITORING CENTRE: BRACKNELL
MONTH: May 2003

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from each unique identifier for drifting buoy.

Area monitored :10°N - 80°N, 85°W - 0°W

Standard of comparison :Background field from UKMO global model.

Position :Average latitude and longitude for period.

Observation times :All hours combined.

Elements monitored :Mean sea-level pressure (hPa)
:Wind speed (m s^{-1})
:Wind direction (degrees)

Parameters monitored

:NOBS :Number of observations received excluding duplicates.

:NGE :Number of observations with gross errors.

:PGE :Percentage of observations with gross errors.

:SD :SD of difference of observations from background values excluding those with gross errors.

:BIAS :Mean difference of observations from background values excluding those with gross errors.
N.B. A positive bias indicates the wind observation is veered to the background

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors

GROSS ERROR LIMITS :15 hPa (pressure)
:25 m s^{-1} (Vector Wind)

N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed > 5 m s^{-1}

IDENTIFIER	LAT.	LONG.	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE									
26501	72.0	-15.3	P	398	0	47	0.6	-0.1	0.6
41503	17.9	-74.5	P	617	0	7	0.7	-1.3	1.4
41522	21.4	-56.2	P	618	0	0	0.6	-1.0	1.1
41531	27.0	-60.0	P	631	0	0	0.5	0.5	0.7
41532	21.9	-67.4	P	656	0	5	0.5	0.7	0.9
41534	27.5	-59.2	P	632	0	0	0.5	0.3	0.6
41537	27.3	-63.9	P	620	0	0	0.5	0.7	0.9
41649	16.3	-61.1	P	540	0	100	0.6	-2.7	2.8
41658	45.6	-26.9	P	716	0	14	0.5	-1.0	1.1
41659	29.1	-30.9	P	651	0	0	0.5	0.1	0.5
41666	34.7	-48.3	P	662	0	0	0.6	0.3	0.6
44585	42.4	-68.7	P	328	0	21	0.9	0.7	1.1
44601	35.7	-46.3	P	617	0	7	0.7	-0.7	1.0
44603	57.5	-31.8	P	634	0	1	0.8	0.0	0.8
44605	53.2	-42.0	P	645	0	0	0.6	-0.1	0.6
44606	31.5	-50.9	P	1037	0	36	0.8	0.1	0.8
44608	36.2	-32.7	P	1010	0	36	0.5	0.1	0.5
44609	54.7	-22.2	P	654	0	3	0.7	-0.7	1.0
44610	42.6	-36.0	P	932	0	30	0.8	0.4	0.9
44611	55.4	-27.7	P	965	4	37	2.6	-0.3	2.6
44613	53.0	-28.4	P	610	0	1	1.1	-0.1	1.1
44614	63.8	-36.4	P	1242	0	48	0.6	-0.5	0.8
44615	46.6	-42.1	P	630	0	0	0.9	-1.1	1.4
44620	40.3	-34.1	P	634	0	0	0.6	0.3	0.7
44621	56.2	-38.1	P	609	0	0	0.6	0.0	0.6
44622	50.0	-38.8	P	629	0	0	0.7	-0.2	0.7
44627	30.2	-17.6	P	144	0	6	0.4	0.3	0.5
44723	40.0	-17.1	P	634	0	0	0.4	0.1	0.4
44726	60.7	-39.8	P	1065	0	36	0.9	0.1	0.9
44730	56.1	-31.5	P	931	0	28	0.6	-0.3	0.7
44764	58.1	-20.0	P	1605	0	59	1.0	-0.2	1.0
44767	58.3	-12.6	P	1030	3	45	2.9	-0.1	2.9
44769	59.5	-33.5	P	48	46	92	5.2	9.9	11.2
44773	43.6	-21.5	P	611	0	1	0.9	0.5	1.0
44774	44.0	-15.1	P	267	0	18	0.5	0.1	0.5
44776	48.8	-22.3	P	306	0	21	1.5	0.4	1.6
44777	41.5	-39.0	P	365	0	20	0.7	0.4	0.8
44778	42.3	-48.8	P	461	0	26	0.8	0.1	0.8
44779	53.6	-36.5	P	494	0	35	0.5	0.0	0.5
44780	58.0	-47.9	P	638	0	44	0.8	-0.1	0.8
47553	44.8	-63.5	P	1	100	100			
47554	73.1	-76.3	P	525	0	31	0.8	0.1	0.8
48589	68.5	-25.7	P	23	0	0	0.5	0.5	0.8
62505	62.2	-16.0	P	959	4	38	3.1	-0.9	3.2
62507	54.3	-11.9	P	156	0	31	3.9	-0.7	3.9
62508	45.3	-3.5	P	647	0	1	0.5	-0.6	0.8
62513	35.6	-26.2	P	646	0	0	0.5	0.2	0.5
62514	32.3	-22.6	P	632	0	0	0.5	0.1	0.5
62515	22.6	-26.7	P	662	0	0	0.5	0.1	0.5
62517	32.7	-18.5	P	906	0	30	0.5	-0.3	0.6
62519	46.8	-4.4	P	989	0	38	0.5	-0.4	0.7
62520	48.8	-16.3	P	595	0	0	0.6	1.0	1.1
62551	44.5	-23.1	P	624	0	0	0.6	1.3	1.5
62552	37.1	-22.3	P	647	0	0	0.5	0.4	0.6
62553	34.9	-18.2	P	664	0	0	0.5	0.3	0.6
62554	40.1	-20.5	P	652	0	0	0.6	0.1	0.6
62555	38.3	-20.3	P	212	0	0	0.4	0.0	0.4
62573	46.6	-16.1	P	862	1	25	0.9	0.2	0.9
62596	40.2	-11.4	P	153	0	10	1.2	-0.5	1.3
62599	56.7	-10.5	P	511	0	38	0.9	-0.1	0.9

IDENTIFIER	LAT.	LONG.	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE									
62600	49.8	-13.7	P	438	0	29	0.5	0.1	0.5
62696	61.8	-24.5	P	852	4	43	2.6	-0.8	2.8
62711	55.0	-53.8	P	687	0	12	0.8	0.1	0.8
62712	59.1	-41.0	P	962	6	38	3.1	0.6	3.2
62801	39.0	-25.6	P	695	0	9	0.5	0.7	0.8
62802	42.0	-22.7	P	634	0	0	0.5	0.4	0.6
62803	45.8	-15.0	P	608	0	5	1.9	0.3	1.9
62804	47.0	-12.2	P	630	0	0	0.5	-0.6	0.8
64606	60.2	-51.1	P	176	1	60	3.8	0.8	3.8
WIND SPEED									
41503	17.9	-74.5	SPEED	326	0	100	1.7	0.1	1.7
41522	21.4	-56.2	SPEED	614	0	100	1.5	-0.2	1.6
41531	27.0	-60.0	SPEED	629	0	100	1.6	-0.3	1.6
41532	21.9	-67.4	SPEED	652	0	100	1.1	-0.8	1.3
41534	27.5	-59.2	SPEED	632	0	100	1.9	-0.2	1.9
41537	27.3	-63.9	SPEED	617	0	100	4.0	1.6	4.3
41649	16.3	-61.1	SPEED	1	0	100	0.0	14.2	14.2
44601	35.7	-46.3	SPEED	612	0	100	2.9	-1.1	3.1
44615	46.6	-42.1	SPEED	626	0	100	3.0	1.9	3.5
44620	40.3	-34.1	SPEED	630	0	100	2.2	-0.2	2.2
62573	46.6	-16.1	SPEED	830	1	100	2.0	-0.3	2.0
62711	55.0	-53.8	SPEED	686	0	100	1.8	1.2	2.1
WIND DIRECTION									
41503	17.9	-74.5	DIRN.	245	0	0	9.5	-17.0	19.5
41522	21.4	-56.2	DIRN.	322	0	0	16.8	-5.4	17.7
41531	27.0	-60.0	DIRN.	123	0	0	18.8	8.4	20.6
41532	21.9	-67.4	DIRN.	404	0	0	13.8	36.7	39.2
41534	27.5	-59.2	DIRN.	161	1	0	15.7	13.7	20.8
41537	27.3	-63.9	DIRN.	196	2	0	26.4	-10.0	28.3
41649	16.3	-61.1	DIRN.	1	0	0	0.0	39.6	39.6
44601	35.7	-46.3	DIRN.	371	0	0	20.5	-1.8	20.6
44615	46.6	-42.1	DIRN.	466	0	0	18.0	-0.5	18.0
44620	40.3	-34.1	DIRN.	453	0	0	20.4	10.7	23.0
62573	46.6	-16.1	DIRN.	631	1	0	25.5	7.3	26.5
62711	55.0	-53.8	DIRN.	469	0	0	21.0	-7.4	22.3

TABLE 9

MONTHLY MONITORING OF AIRCRAFT OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: May 2003

Monitoring procedures:

Period :One calendar month.

Data monitored :Statistics for each airline carrier.

Area monitored :40°N - 70°N, 60°W - 0°W.

Standard of comparison :Background field from UKMO global model.

Observation times :All hours combined.

Level(s) monitored :300.0 - 150.0 hPa

Elements monitored :TEMP in °C ; WIND in m s^{-1}

Parameters monitored :N REP. :Number of observations received excluding duplicates.

:PG :Percentage of observations with gross errors.

:PR :Percentage of observations rejected by quality control including rejections from the duplicate check.

:PC :Percentage of observations with calm winds.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors in Temperature & vector wind.

:BIAS :Mean difference of observations from background values excluding those with gross errors in Temperature & vector wind.

GROSS ERROR LIMITS :10.0 °C ; 60 m s^{-1} Vector Wind

SELECTION CRITERIA :N REP $\geq$ 20

NB: All American ACARS data are grouped together and statistics are shown at the bottom of the table as "US ACARS". All ADS reports are similarly grouped together.

	TEMPERATURE					WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
AAL	549	0	9	1.8	0.2	477	0	9	0	8.1	0.6
ACA	902	0	3	1.6	-0.2	875	0	3	0	7.1	0.6
AEA	149	0	3	1.2	0.6	60	0	5	0	5.4	1.2
AEL	245	0	12	1.6	-0.4	201	0	15	0	8.5	-0.1
AEW	43	2	5	1.5	-0.7	42	0	14	0	11.0	0.8
AFL	306	0	3	1.7	0.3	298	0	4	0	7.1	0.5
AFR	656	0	5	1.4	0.0	542	0	6	0	6.5	0.6
AIS	155	0	9	1.7	-0.4	141	2	16	0	9.9	0.2
AJM	256	0	3	1.6	-0.6	216	0	5	0	8.7	0.3
AMM	78	0	1	1.5	0.4	59	0	5	0	10.3	0.5
AMT	100	2	13	1.8	0.1	102	1	12	0	8.5	0.0
AMX	145	4	7	1.7	0.0	98	2	10	0	11.0	-0.1
AZA	286	1	5	1.6	-0.1	263	0	5	0	8.1	0.0
BAF	27	0	0	1.8	-1.0	29	3	3	0	4.1	1.7
BAL	90	0	9	1.1	0.2	84	0	12	0	7.4	0.2
BAW	420	0	7	2.0	-0.8	405	0	7	0	6.5	0.3
BPA	108	0	6	1.5	-0.3	93	4	13	0	6.0	0.2
BSK	24	0	4	2.3	-0.1	24	0	13	0	11.0	-1.8
BWA	121	0	7	1.6	-0.3	91	0	7	0	10.0	-0.1
CFC	38	0	11	1.3	-0.3	40	0	13	0	5.4	1.3
CFG	332	0	6	1.7	-0.7	292	0	6	0	7.7	0.1
CGA	144	0	1	1.4	-0.4	138	0	0	0	3.8	1.2
CGF	47	0	0	1.3	-0.3	46	0	0	0	4.5	0.7
CGH	140	0	2	1.3	-0.1	135	0	4	0	4.9	0.9
CKS	170	1	12	2.3	1.1	161	1	10	0	10.2	0.3
CLX	210	0	1	1.7	-0.6	202	0	1	0	7.4	-0.1
COA	152	0	45	1.5	-0.2	83	0	54	0	8.3	-0.3
CRL	158	1	4	1.7	0.6	117	0	4	0	8.5	0.5
CUB	78	1	3	1.7	-0.4	60	0	2	0	6.5	1.8
DAB	463	0	11	1.3	-0.2	450	0	12	0	3.9	0.7
DAI	276	0	5	1.3	0.2	267	0	5	0	3.7	0.9
DAL	593	0	8	1.7	-0.8	532	0	9	0	7.0	0.4
DBR	40	0	0	1.5	-0.6	40	3	3	0	5.7	-0.6
DCE	86	0	10	1.6	-1.1	77	0	14	0	8.6	0.0
DHL	195	2	100	6.5	-6.3	190	0	41	0	11.4	1.5
DLH	652	0	12	1.6	-0.1	646	0	11	0	6.2	0.7
EIA	269	1	72	3.1	1.4	269	0	100	0	20.4	6.0
ELY	138	1	7	2.0	-0.2	134	0	4	0	7.6	0.2
FDX	779	0	33	1.5	0.1	775	0	34	0	8.5	0.1
FGS	168	0	2	1.6	0.6	163	0	2	0	3.8	0.7
FIN	199	1	4	1.6	-0.1	190	0	3	0	6.4	0.5
GAF	46	2	4	1.5	-0.6	46	0	4	0	6.1	0.2
GCO	314	1	8	1.6	-0.2	304	0	100	0	10.9	2.4
GEV	20	0	0	3.0	2.7	20	0	0	0	4.5	0.4
GOJ	72	0	3	1.2	0.4	71	0	3	0	4.1	1.2
GRL	70	0	0	1.2	0.3	63	0	0	0	3.9	0.4
GTI	141	0	8	1.7	0.1	140	0	8	0	6.6	0.2
GVA	50	0	0	1.1	-0.1	48	0	0	0	3.9	0.2
GVB	49	0	0	1.3	0.5	47	0	0	0	4.3	0.8
GVF	30	0	0	1.3	-0.8	28	0	0	0	4.2	0.2
GVG	40	0	3	1.4	-0.3	39	0	3	0	3.9	0.6
GVH	34	0	3	1.0	-0.2	32	0	3	0	4.3	1.3
GVL	47	0	0	1.1	0.1	46	0	0	0	4.9	1.2
GVR	160	0	1	1.4	-0.1	153	0	1	0	4.8	0.7
GVW	35	0	0	1.3	-0.5	34	0	0	0	4.2	1.3
GVX	50	0	0	1.3	0.2	48	0	0	0	4.0	0.5
GWW	53	0	4	1.5	0.0	51	0	4	0	3.1	0.7
GYM	21	0	5	1.1	0.3	20	0	5	0	3.1	-0.3
IBE	874	1	7	1.7	0.5	517	0	9	0	8.2	0.4

	TEMPERATURE					WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
ICE	792	1	3	1.4	-0.2	770	0	3	0	5.8	0.7
KLM	887	0	3	1.6	-0.2	800	0	3	0	6.9	0.7
LAN	33	3	15	2.7	-0.3	35	0	11	0	9.2	0.3
LDI	243	1	6	1.5	-0.5	202	0	3	0	7.0	-0.1
LOT	104	2	11	1.9	-1.2	97	0	9	0	9.9	-0.2
LTU	451	1	6	1.7	-0.3	407	0	6	0	6.7	0.2
MON	56	0	2	1.2	0.0	49	0	4	0	8.5	-0.1
MPD	85	0	1	1.7	0.4	31	0	0	0	6.3	1.4
MPH	325	0	2	1.9	-1.2	308	0	3	0	7.2	0.1
MYT	169	0	1	1.4	-0.1	161	0	4	0	7.3	1.7
NCA	34	0	0	1.1	0.0	29	0	0	0	3.5	0.9
NWA	3073	1	3	1.6	0.2	3115	0	3	0	6.4	0.6
OAE	61	2	3	1.2	0.1	64	2	19	0	12.8	3.3
PAC	212	0	8	2.1	0.0	214	0	7	0	8.1	-0.8
RAM	154	1	5	1.6	0.1	100	1	100	0	9.4	-0.5
RCH	360	2	19	2.8	0.6	302	0	100	0	10.5	1.2
RJA	48	10	10	1.5	-0.2	50	2	4	0	6.4	0.5
RZO	132	0	0	1.4	-0.5	99	1	2	0	7.0	0.9
SEU	63	0	0	1.2	0.0	60	0	0	0	4.9	0.2
SLR	131	1	9	1.2	-0.4	122	0	11	0	6.6	-0.2
TAP	221	0	6	1.2	-0.2	131	1	10	0	7.7	0.1
THT	22	0	9	1.4	-0.2	20	0	10	0	5.0	1.1
TSC	161	1	1	1.8	-0.5	157	1	2	0	6.7	0.4
UAL	120	0	53	1.9	-0.9	107	0	59	0	6.2	0.8
UPS	1165	1	47	1.7	0.0	1142	0	47	0	7.6	0.1
VIR	150	1	5	1.7	0.0	150	0	7	0	9.3	0.4
WOA	220	0	7	1.6	0.1	218	0	10	0	8.6	1.1
9VS	125	0	3	1.5	0.0	125	0	3	0	4.4	0.9
EU	28813	0	17	1.2	0.1	28813	0	17	0	4.1	0.4
KL	657	0	8	1.1	0.5	656	0	8	0	4.5	0.8
SA	25	0	4	1.5	0.8	25	0	4	0	4.9	0.3
N	2431	0	12	1.6	0.1	2374	0	11	0	4.6	1.1
US ACARS	21035	8	41	1.3	0.2	21035	0	34	0	5.1	0.6

TABLE 10

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: May 2003

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from selected radiosonde TEMPs.
Area monitored		:0°N - 90°N, 100°W - 40°E
Standard of comparison		:Background field from UKMO global model.
Position		:Average latitude and longitude for period.
Observation times		:00, 12 UTC.
Level monitored		:100 hPa.
Element monitored		:GEOPOTENTIAL HEIGHT in metres
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:SD	:SD of difference of observations from background values at level shown excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.1

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	SD	RMS	BIAS
ASAP3	12	Z	100	1	0	0.0	30.0	30.0
DASAP1	12	Z	100	1	0	0.0	34.0	34.0
DBBH	00	Z	100	6	0	24.3	26.9	-11.5
DBBH	12	Z	100	11	0	17.9	24.8	17.2
DBLK	12	Z	100	9	0	12.5	13.7	5.7
EBUQ	12	Z	100	19	0	18.1	24.2	16.1
ELML7	00	Z	100	15	0	11.1	20.9	17.7
ELML7	12	Z	100	13	0	9.9	20.4	17.8
FNPH	00	Z	100	9	0	12.2	16.2	-10.7
FNPH	12	Z	100	6	1	23.8	23.8	-1.5
FNRS	00	Z	100	11	0	15.9	35.4	-31.6
FNRS	12	Z	100	9	0	34.6	39.5	-19.1
LDWR	00	Z	100	24	0	8.0	10.1	6.2
LDWR	12	Z	100	29	0	11.9	12.2	-2.5
OXVH2	00	Z	100	4	0	10.4	10.5	1.3
OXVH2	12	Z	100	4	0	9.0	9.2	-2.0
OXYH2	00	Z	100	9	0	5.1	8.8	7.1
OXYH2	12	Z	100	6	0	6.4	12.0	10.2
SWJS	00	Z	100	2	0	2.0	15.1	15.0
SWJS	12	Z	100	2	0	5.5	18.3	17.5
V2XM	00	Z	100	2	0	7.0	9.2	6.0
V2XM	12	Z	100	3	0	3.3	14.1	13.7
WPKD	00	Z	100	2	0	0.5	3.5	3.5
WPKD	12	Z	100	4	0	9.1	15.9	13.0
ZCBP6	00	Z	100	4	0	10.6	44.5	43.3
ZCBP6	12	Z	100	5	0	25.9	52.6	45.8
03953	00	Z	100	26	0	10.1	15.1	11.2
03953	12	Z	100	29	0	11.9	12.3	3.1
04018	00	Z	100	25	0	7.6	13.8	11.6
04018	12	Z	100	27	0	12.7	14.9	7.8
04220	00	Z	100	24	0	8.0	8.4	2.6
04220	12	Z	100	28	0	10.0	10.5	3.1
04270	00	Z	100	24	0	8.3	9.3	4.2
04270	12	Z	100	29	0	10.1	12.0	6.4
04339	00	Z	100	24	0	9.3	13.1	9.3
04339	12	Z	100	29	0	11.3	16.0	11.4
04360	00	Z	100	24	0	15.1	16.0	5.4
04360	12	Z	100	29	0	15.7	16.4	4.7
08001	00	Z	100	20	0	16.3	16.3	0.6
08001	12	Z	100	18	1	30.6	30.6	1.1
08508	12	Z	100	28	0	24.9	44.3	36.6
08522	12	Z	100	27	0	13.1	24.3	20.5
08594	12	Z	100	19	0	15.1	15.2	2.1
71600	00	Z	100	26	0	12.8	18.8	13.7
71600	12	Z	100	29	0	9.2	25.1	23.3
72201	00	Z	100	26	0	11.2	33.8	31.9
72201	12	Z	100	29	0	13.8	44.6	42.4
72402	00	Z	100	25	0	16.2	58.4	56.1
72402	12	Z	100	29	0	12.5	73.2	72.1
74494	00	Z	100	21	0	12.2	25.1	22.0
74494	12	Z	100	27	0	13.1	17.6	11.7
78016	00	Z	100	25	0	11.4	33.6	31.6
78016	12	Z	100	29	0	13.6	37.3	34.7

TABLE 11

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: May 2003

Monitoring procedures:

Period		:One calendar month.
Data monitored		:Reports from selected radiosonde TEMPs.
Area monitored		:0°N - 90°N, 100°W - 40°E
Standard of comparison		:Background field from UKMO global model.
Position		:Average latitude and longitude for period.
Observation times		:00, 12 UTC.
Level monitored		:500 hPa.
Element monitored		:GEOPOTENTIAL HEIGHT in metres
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:SD	:SD of difference of observations from background values at level shown excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.1

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	SD	RMS	BIAS
ASAP3	12	Z	500	1	0	0.0	3.0	-3.0
DASAP1	12	Z	500	2	0	2.0	2.0	0.0
DBBH	00	Z	500	7	0	9.5	16.3	-13.3
DBBH	12	Z	500	11	0	5.4	7.6	5.3
DBLK	12	Z	500	10	0	11.1	15.0	10.0
EBUQ	12	Z	500	19	0	10.4	10.5	-1.6
ELML7	00	Z	500	16	0	3.8	4.2	-1.9
ELML7	12	Z	500	14	0	6.8	6.9	0.9
FNPH	00	Z	500	11	0	6.6	12.8	-11.0
FNPH	12	Z	500	8	1	13.5	14.6	-5.5
FNRS	00	Z	500	11	0	4.0	21.9	-21.5
FNRS	12	Z	500	13	0	24.2	31.2	-19.7
LDWR	00	Z	500	24	0	6.5	8.2	5.0
LDWR	12	Z	500	29	0	6.3	7.5	4.2
OXVH2	00	Z	500	5	0	10.0	13.5	9.0
OXVH2	12	Z	500	4	0	6.2	8.1	5.3
OXYH2	00	Z	500	9	0	5.6	13.2	11.9
OXYH2	12	Z	500	7	0	9.0	17.5	15.0
SWJS	00	Z	500	3	0	4.2	7.0	-5.7
SWJS	12	Z	500	2	0	4.5	5.7	-3.5
V2XM	00	Z	500	3	1	16.1	17.0	-5.3
V2XM	12	Z	500	3	0	7.1	17.5	16.0
WPKD	00	Z	500	2	0	3.0	8.5	-8.0
WPKD	12	Z	500	4	0	4.2	4.2	0.5
ZCBP6	00	Z	500	4	0	2.9	28.9	28.8
ZCBP6	12	Z	500	5	0	13.2	23.6	19.6
03953	00	Z	500	26	0	7.5	7.7	1.4
03953	12	Z	500	29	0	8.2	8.3	0.6
04018	00	Z	500	26	0	9.1	14.0	10.7
04018	12	Z	500	29	0	7.2	13.2	11.0
04220	00	Z	500	24	0	10.4	12.3	6.6
04220	12	Z	500	28	0	6.2	13.2	11.7
04270	00	Z	500	24	0	8.7	13.0	9.7
04270	12	Z	500	29	0	8.7	15.9	13.3
04339	00	Z	500	24	0	8.0	17.3	15.3
04339	12	Z	500	29	0	10.9	17.2	13.3
04360	00	Z	500	24	0	8.6	11.9	8.2
04360	12	Z	500	29	0	7.2	13.8	11.8
08001	00	Z	500	23	0	11.2	15.3	-10.5
08001	12	Z	500	27	1	12.2	16.3	-10.8
08508	12	Z	500	28	0	7.1	7.2	1.1
08522	12	Z	500	27	0	6.4	7.2	3.3
08594	12	Z	500	24	0	8.2	10.1	-5.9
71600	00	Z	500	26	0	7.2	7.6	-2.5
71600	12	Z	500	29	0	7.0	11.4	9.0
72201	00	Z	500	26	0	5.8	5.9	-1.2
72201	12	Z	500	29	0	5.5	5.5	-0.1
72402	00	Z	500	25	0	8.4	8.6	2.0
72402	12	Z	500	29	0	6.3	8.4	5.5
74494	00	Z	500	22	0	8.2	8.6	-2.5
74494	12	Z	500	28	0	8.9	10.1	-4.8
78016	00	Z	500	25	0	7.5	10.5	7.4
78016	12	Z	500	29	0	7.0	13.5	11.5

TABLE 12

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: May 2003

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from selected radiosonde TEMPs.

Area monitored :0°N - 90°N, 100°W - 40°E

Standard of comparison :Background field from UKMO global model.

Position :Average latitude and longitude for period.

Observation times :00, 12 UTC.

Level monitored :100 hPa.

Element monitored :VECTOR WIND in $m\ s^{-1}$

Parameters monitored :NUM OBS :Number of observations available at level shown during period.

:NUM GROSS :Number of gross errors at level shown during period.

:UBIAS,VBIAS :Mean difference of observations of U and V components from background values at level shown excluding those with gross errors.

:RMS :Root Mean Square difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.2

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	% REJ	RMS	UBIAS	VBIAS
ASAP3	12	V	100	1	0	0	2.6	0.0	2.6
DASAP1	12	V	100	1	0	0	1.0	-1.0	-0.2
DBBH	00	V	100	5	0	0	7.9	-2.0	-2.1
DBBH	12	V	100	10	0	0	4.4	-1.6	0.2
DBLK	12	V	100	9	0	0	2.4	0.6	-0.4
EBUQ	12	V	100	19	0	0	5.8	-1.7	-1.5
ELML7	00	V	100	12	0	0	3.9	-0.1	0.1
ELML7	12	V	100	13	0	0	5.0	-1.1	0.1
FNPH	00	V	100	7	0	0	5.4	1.3	1.5
FNPH	12	V	100	5	0	0	2.8	-0.4	0.3
FNRS	00	V	100	11	0	0	3.7	-0.8	0.7
FNRS	12	V	100	9	0	0	3.1	-1.6	1.1
LDWR	00	V	100	24	0	0	1.8	-0.4	-0.1
LDWR	12	V	100	29	0	0	2.0	-0.4	0.1
OXVH2	00	V	100	4	0	0	2.4	0.3	0.6
OXVH2	12	V	100	4	0	0	2.2	0.8	0.0
OXYH2	00	V	100	9	0	0	3.6	-0.6	-0.5
OXYH2	12	V	100	5	0	20	9.4	-3.8	0.4
SWJS	00	V	100	2	0	0	4.1	-0.7	-2.3
SWJS	12	V	100	2	0	0	1.4	-0.4	-0.5
V2XM	00	V	100	2	0	0	1.9	-0.4	-1.5
V2XM	12	V	100	2	0	0	2.5	0.7	-0.5
WPKD	00	V	100	2	0	0	2.0	1.8	0.7
WPKD	12	V	100	3	0	0	3.6	1.3	-0.5
ZCBP6	00	V	100	3	0	0	4.3	-2.0	-2.1
ZCBP6	12	V	100	4	0	0	5.5	1.5	2.3
03953	00	V	100	26	0	0	2.5	0.7	0.8
03953	12	V	100	29	0	0	2.6	0.8	0.5
04018	00	V	100	25	0	0	2.5	-0.1	0.7
04018	12	V	100	26	0	0	2.2	0.1	0.1
04220	00	V	100	24	0	0	2.7	0.3	0.0
04220	12	V	100	28	0	0	2.6	0.4	-0.5
04270	00	V	100	24	0	0	2.3	-0.4	-0.1
04270	12	V	100	29	0	0	3.6	-0.2	-0.3
04339	00	V	100	23	0	4	6.0	-1.2	0.0
04339	12	V	100	28	0	0	4.8	0.8	0.2
04360	00	V	100	24	0	0	2.8	-0.5	0.9
04360	12	V	100	29	0	0	1.8	0.2	-0.4
08001	00	V	100	19	0	0	4.4	1.7	-0.1
08001	12	V	100	17	0	0	3.8	0.3	1.3
08508	12	V	100	13	0	0	3.3	1.1	0.9
08522	12	V	100	26	0	0	3.9	0.7	0.3
08594	12	V	100	19	0	100	4.7	-3.4	0.7
71600	00	V	100	26	0	0	3.3	0.4	-0.9
71600	12	V	100	29	0	0	3.5	0.5	0.0
72201	00	V	100	26	0	0	4.0	1.3	0.0
72201	12	V	100	29	0	0	4.0	1.4	0.0
72402	00	V	100	26	0	0	4.1	0.7	0.9
72402	12	V	100	29	0	0	3.3	-0.1	0.6
74494	00	V	100	21	0	100	2.3	0.3	0.2
74494	12	V	100	27	0	100	2.7	0.2	1.2
78016	00	V	100	25	0	0	4.7	0.0	-0.6
78016	12	V	100	28	0	0	4.1	0.1	1.6

TABLE 13

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: May 2003

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from selected radiosonde TEMPs.
Area monitored		:0°N - 90°N, 100°W - 40°E
Standard of comparison		:Background field from UKMO global model.
Position		:Average latitude and longitude for period.
Observation times		:00, 12 UTC.
Level monitored		:500 hPa.
Element monitored		:VECTOR WIND in $m\ s^{-1}$
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:UBIAS,VBIAS:	Mean difference of observations of U and V components from background values at level shown excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.2

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	% REJ	RMS	UBIAS	VBIAS
ASAP3	12	V	500	1	0	0	0.2	0.1	-0.2
DASAP1	12	V	500	2	0	0	2.9	0.6	2.0
DBBH	00	V	500	5	0	0	3.6	-1.8	-2.2
DBBH	12	V	500	11	0	0	4.1	-1.6	0.5
DBLK	12	V	500	10	0	0	4.4	0.2	1.3
EBUQ	12	V	500	19	0	0	4.2	-1.3	-0.8
ELML7	00	V	500	14	0	0	2.6	-0.2	0.1
ELML7	12	V	500	13	0	0	2.7	0.2	0.5
FNPH	00	V	500	11	0	0	3.0	-0.5	0.4
FNPH	12	V	500	9	0	0	3.9	-0.3	-0.1
FNRS	00	V	500	11	0	0	4.3	-0.8	-0.2
FNRS	12	V	500	13	0	0	4.9	-0.6	-0.5
LDWR	00	V	500	24	0	0	3.0	-0.8	0.3
LDWR	12	V	500	29	0	0	3.2	-0.5	-0.6
OXVH2	00	V	500	5	0	0	3.0	0.3	0.8
OXVH2	12	V	500	4	0	0	3.7	1.3	0.8
OXYH2	00	V	500	9	0	0	5.6	-1.3	-0.6
OXYH2	12	V	500	6	0	16	22.8	-9.0	-3.5
SWJS	00	V	500	3	0	0	1.8	0.5	-0.6
SWJS	12	V	500	2	0	0	4.8	2.4	2.6
V2XM	00	V	500	4	0	0	2.8	0.6	-0.7
V2XM	12	V	500	3	0	0	6.1	3.3	1.0
WPKD	00	V	500	2	0	0	2.4	-1.5	-1.0
WPKD	12	V	500	4	0	0	1.8	0.6	-1.2
ZCBP6	00	V	500	2	0	0	3.3	1.8	0.0
ZCBP6	12	V	500	3	0	0	1.7	0.8	-0.1
03953	00	V	500	26	0	0	4.0	-0.2	0.2
03953	12	V	500	29	0	0	4.1	1.3	1.0
04018	00	V	500	26	0	0	3.4	0.1	-1.0
04018	12	V	500	28	0	0	3.3	0.4	-0.1
04220	00	V	500	24	0	0	3.7	-0.3	-0.3
04220	12	V	500	28	0	0	4.4	0.4	-0.8
04270	00	V	500	24	0	0	3.8	-0.8	-0.6
04270	12	V	500	28	0	0	3.9	-0.8	0.4
04339	00	V	500	24	0	0	4.7	-1.2	-0.5
04339	12	V	500	28	0	0	5.0	0.7	-0.5
04360	00	V	500	24	0	0	4.6	-0.6	0.3
04360	12	V	500	29	0	0	3.5	-0.1	-0.2
08001	00	V	500	22	0	0	4.4	1.1	1.5
08001	12	V	500	28	0	0	3.9	0.2	-0.1
08508	12	V	500	15	0	0	2.5	0.3	0.3
08522	12	V	500	26	0	0	3.7	-0.6	0.6
08594	12	V	500	24	0	100	8.5	-2.2	-1.3
71600	00	V	500	26	0	0	4.5	-0.8	0.0
71600	12	V	500	28	0	0	3.9	0.3	0.5
72201	00	V	500	26	0	0	2.8	-0.1	-1.2
72201	12	V	500	29	0	0	2.5	0.0	-0.4
72402	00	V	500	26	0	0	4.2	0.3	0.2
72402	12	V	500	29	0	0	2.8	0.3	-0.1
74494	00	V	500	22	0	100	3.3	-0.8	-0.9
74494	12	V	500	28	0	100	3.4	0.3	-0.1
78016	00	V	500	25	0	0	4.3	-0.1	0.7
78016	12	V	500	28	0	0	4.2	1.0	-0.1

APPENDIX I

1. The gross error limits for observation minus background differences of geopotential height in Tables 5, 10 and 11 are:-

Level (hPa)	Geopotential height (metres)
1000	100
850	100
700	100
500	150
400	175
300	200
250	225
200	250
150	275
100	300
70	375
50	400
30	450

The weighted RMS values used in Table 5,10 and 11 are calculated using the following weights:-

Level (hPa)	Weight
1000	3.70
850	3.40
700	2.90
500	2.20
400	1.90
300	1.60
250	1.50
200	1.37
150	1.19
100	1.00
70	0.87
50	0.80
30	0.64

2. The gross error limits for observation minus background differences of windspeed in Tables 6,12 and 13 are:-

Level (hPa)	Windspeed m s^{-1}
1000	35
850	35
700	40
500	45
400	50
300	60
250	60
200	50
150	50
100	45